AD_____

Award Number: DAMD17-99-1-9303

TITLE: Post-doctoral Training Program in Bio-behavioral Breast Cancer Research

PRINCIPAL INVESTIGATOR: Dana Bovbjerg, Ph.D.

CONTRACTING ORGANIZATION: Mount Sinai School of Medicine
New York, New York 10029

REPORT DATE: June 2001

TYPE OF REPORT: Annual Summary

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 074-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 2001	Annual Summary (1 May 00 - 1 May 01)

4. TITLE AND SUBTITLE

Post-doctoral Training Program in Bio-behavioral Breast Cancer Research

5. FUNDING NUMBERS

DAMD17-99-1-9303

6. AUTHOR(S)

Dana Bovbjerg, Ph.D.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Mount Sinai School of Medicine
New York, New York 10029

E-Mail: dana.bovbjerg@mssm.edu

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for Public Release; Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 Words)*

Accumulating evidence indicates that the "biobehavioral model" of health and disease may have considerable relevance for cancer generally, and breast cancer in particular. Broadly stated, this model proposes that what people think and feel affects the state of their health in two basic ways: by affecting their behavioral choices (e.g., smoking) and by affecting biological processes (e.g., cortisol levels) that affect risk and response to disease. Given the complexity of the interactions postulated by the biobehavioral model, to fully explore its implications for breast cancer it will be important to increase the number of researchers with the broad-based training that allows them to conduct truly interdisciplinary research addressing issues that transcend traditional disciplinary boundaries. Our ongoing Postdoctoral Training Program in Biobehavioral Breast Cancer Research is designed to provide trainees with advanced degrees in relevant areas (e.g., epidemiology, medicine, psychology, public health) with the necessary intellectual background needed to "speak the language" of the multiple relevant disciplines and with the "hands-on" experience under the tutelage of experienced mentors necessary to do interdisciplinary research and become independent investigators.

14. SUBJECT TERMS

15. NUMBER OF PAGES
199

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

FOREWORD

Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the U.S. Army.

__X__ Where copyrighted material is quoted, permission has been obtained to use such material.

__X__ Where material from documents designated for limited distribution is quoted, permission has been obtained to use the material.

__X__ Citations of commercial organizations and trade names in this report do not constitute an official Department of Army endorsement or approval of the products or services of these organizations.

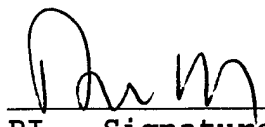
__N/A__ In conducting research using animals, the investigator(s) adhered to the "Guide for the Care and Use of Laboratory Animals," prepared by the Committee on Care and use of Laboratory Animals of the Institute of Laboratory Resources, national Research Council (NIH Publication No. 86-23, Revised 1985).

__N/A__ For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

__N/A__ In conducting research utilizing recombinant DNA technology, the investigator(s) adhered to current guidelines promulgated by the National Institutes of Health.

__N/A__ In the conduct of research utilizing recombinant DNA, the investigator(s) adhered to the NIH Guidelines for Research Involving Recombinant DNA Molecules.

__N/A__ In the conduct of research involving hazardous organisms, the investigator(s) adhered to the CDC-NIH Guide for Biosafety in Microbiological and Biomedical Laboratories.



6/29/01

PI - Signature Date

(original signed copy on file)

TABLE OF CONTENTS

5. INTRODUCTION:

Accumulating evidence indicates that the "biobehavioral model" of health and disease may have considerable relevance for cancer generally, and breast cancer in particular. Broadly stated, this model proposes that what people think and feel affects the state of their health in two basic ways: by affecting their behavioral choices (e.g., smoking) and by affecting biological processes (e.g., cortisol levels) that affect risk and response to disease. Given the complexity of the interactions postulated by the biobehavioral model, to fully explore its implications for breast cancer it will be important to increase the number of researchers with the broad-based training that allows them to conduct truly interdisciplinary research addressing issues that transcend traditional disciplinary boundaries. Our ongoing Postdoctoral Training Program in Biobehavioral Breast Cancer Research is designed to provide trainees with advanced degrees in relevant areas (e.g., epidemiology, medicine, psychology, public health) with the necessary intellectual background needed to "speak the language" of the multiple relevant disciplines and with the "hands-on" experience under the tutelage of experienced mentors necessary to do interdisciplinary research and become independent investigators.

6. BODY:

The past year was the second a four year funded program of postdoctoral training. Our primary focus during this early phase of the grant has been the initiation of all aspects of the proposed training program, Task 1 (a-k):

a) Consistent with our proposed developmental plan, in Year 1 we instituted a nation-wide search for applicants for the three postdoctoral positions supported during this first year of the program. We received more than 130 applications from candidates around the country. Subsequently continued advertising has resulted in more than 100 additional applicants.

b) After an extensive evaluation process, including in person interviews with the strongest applicants, we made offers to four outstanding candidates, who joined the program in 1999 as member of the first class of Trainees, Drs. Julie Britton, Jennifer Egert, Josephine Guevarra and Tricia Tang. Dr. Guevarra subsequently received an outstanding offer of a position in industry, and therefore resigned from the program. Completing the program this year, were Drs. Tang and Egert. Two outstanding new trainees have begun training this year: Drs. Youngmee Kim and Daniel David. A third very strong candidate has recently signed on to begin training in September after completion of her Ph.D. in clinical psychology at St. John's University.

c) We have initiated and scheduled a series of Core Course lectures presented by members of the faculty of the Mount Sinai School of Medicine, supplemented by outside speakers with particular expertise on relevant topics. For example, internal speakers have included Drs. George Raptis and Roger Waltzman of the Department of Medicine, who have provided an integrated series of three lectures entitled: "An introduction to the pathobiology of breast cancer"; "The clinical management of early stage breast cancer"; and, "The treatment of metastatic breast cancer." A recent outside speaker was Dr. Gary Winkel, who presented a special seminar on "Methods for Exact Statistical Tests of Hypotheses: Small Sample Analysis with Es Pro and SAS Proc Freq."

d) In addition we have supported a series of research seminars by Mount Sinai faculty and outside speakers to provide Trainees with exposure to recent developments in Cancer Prevention and Control, as well as related disciplines. For example, a recent outside speaker was Dr. Tim Ahles of Dartmouth Medical School, who provided a lecture on "Cognitive function, chemotherapy, and the Dartmouth experience".

e) As indicated above, both the Core Course Curriculum and Seminar Series have been running over the past year.

f) We have inaugurated the hands-on portion of the training program through the active mentoring of trainees by federally-funded faculty members.

g) The Luncheon Lecture series, covering recent journal articles, work in progress by local investigators, and career development considerations by outside speakers has been scheduled and run. For the next year, we plan to run this service on a working breakfast meeting to save time the day for research.

h) Guidance in the development of independent research projects has been provided by the mentors for each Trainee, as well as by feedback from other members of the faculty made more informally as part of the Luncheon Lecture series.

I) Oversight for each Trainee's independent project is being provided by their Mentor and more informally by the rest of the faculty at Work-in-Progress (WIP) presentations as part of the Luncheon Lecture series.

j) A formal evaluation of Trainees and the Program was conducted at the end of their third month in the program. An informal year end evaluation has been conducted on a rolling basis around the time each Trainee completes their first year of the Program.

k) In the first year of each Trainee's participation in the program, the focus has been the preparation of research reports from previous relevant research they may have conducted before joining the program, the preparation of research reports from the data collected from projects previously collected by their Mentors, and the preparation of initial reports concerning data which they collected during their first year of the Program. The development of Trainee's skills in grant writing has been fostered by one-on-one tutorials about the process as their Mentors have written and submitted grants, as well as by participation in our "in-house" grant review meetings in which faculty present their preliminary drafts of applications. The second year's training has focused on the initiation of their own research projects, preparation of abstracts and presentations, and writing manuscripts for publication.

7. KEY RESEARCH ACCOMPLISHMENTS:

1) Key research accomplishments

Conducted training program for 4 Postdoctoral Trainees

Recruited trainee applications
Evaluated potential trainees
Developed and scheduled Core Curriculum
Scheduled Seminar Series
Ran Core Curriculum and Seminar Series
Established "hands-on" research experience for each Trainee
Scheduled and ran Luncheon Lecture series
Guided development of independent research projects for each Trainee

Provided oversight for each Trainee's independent project
Facilitated preparation of research reports and grant applications

8. REPORTABLE OUTCOMES:

These are grouped alphabetically by Trainee (Bold = Trainee)
* Attached published this reported period

DR. JULIE BRITTON:

YEAR 1:

Westoff C, **Britton JA**, Gammon MD, Wright T, Kelsey J. (2000). Oral contraceptives and benign ovarian tumors. American Journal of Epidemiology 152(3):242-246.

Britton JA, Westhoff C, Howe G, Gammon MD. Diet and benign ovarian tumors. (2000). Cancer Causes and Control 11(5):389-401.

Britton JA, Gammon MD, Kelsey JL, Brogan DJ, Coates RJ, Schoenberg JB, Potischman N, Swanson CA, Stanford JL, Brinton LA. (2001). Characteristics associated with recent recreational exercise among women 20 to 44 years of age. Women & Health 31(2/3):81-96.

Gammon MD, Neugut AI, Santella RM, Teitelbaum SL, **Britton JA**, Terry MB, Eng SM, Wolff MS, Stellman SD, Kabat GC, Levin B, Bradlow HL, Hatch M, Beyea J, Camann D, Trent M, Senie RT, Garbowski GC, Maffeo C, Montalvan P, Berkowitz GS, Kemeny M, Citron M, Schnabel F, Schuss A, Hajdu S, Vincguerra V, Collman GW, Obrams GI. (2000). The Long Island Breast Cancer Study Project: Description of a multi-institutional collaboration to identify environmental risk factors for breast cancer (submitted, Breast Cancer Research and Treatment).

Stellman SD, Djordjevic MV, **Britton JA**, Muscat JE, Citron ML, Kemeny M, Busch E. (2000) Breast cancer risk in relation to adipose concentration of organochloride pesticides and polychlorinated biphenyls in Long Island, New York. Cancer Epidemiology,Biomarkers & Prevention 9: 1241-1249

Wolff MS, Berkowitz GS, Lapinski R, **Britton JA**, Forman J, Hochman S, Kabat GC, Godbold J, Larson S. (submitted and under revision). Ethnic differences in onset of puberty and the influence of diet. American Journal of Clinical Nutrition).

Britton JA, Westhoff C, Howe GR, Gammon MD. (2000). Lactose and benign ovarium tumors in a case-control study. British Journal of Cancer 83(11):1552-1555.

YEAR 2:

Gammon MD, Santella RM, Neugut AI, Eng SM, Teitelbaum SL, Paykin A, Levin B, Terry MB, Young T, Wang L, Wang Q, **Britton JA**, Wolff MS, Stellman SD, Hatch M, Kabat GC, Senie R, Garbowski G, Maffeo C, Montalvan P, Berkowitz GS, Kemeny M, Citron M, Schmabel F, Schuss A, Hajdu S, Vincguerra V. PAH-DNA adducts and the risk of breast cancer among women on Long Island (submitted, Journal of the National Cancer Institute.)

Britton JA, Kushi L, Morabi A, Bernstein J, Shore R, Geringer W, Rohan T. The development of a questionnaire to assess past year physical activity in a multi-ethnic/racial urban population (in preparation for submission to Sozial-und Praventivmedizin).

Britton JA, Gammon MD, Schoenberg JB, et al. Risk of breast cancer classified by joint steroid receptor status in relation to established and putative hormone-related characteristics among women 20 to 54 years (circulated to co-authors 4/9/2001).

Britton JA, Westhoff CL, Howe G, Gammon MD. The relation between lactose and benign ovarian tumors in a case-control study (Poster abstract). American Journal of Epidemiology 1999;149:S6.

Britton JA, Wolff MS, Berkowitz GS. Pubertal development in relation to recreational physical activity, sedentary activity and body size (**Not accepted**, poster abstract).

DR. JENNIFER EGERT:

YEAR 1:

Keefe FJ, Lefebvre J, **Egert JR**, Affleck G, Sullivan MJ, Caldwell DS. (2000). Catastrophizing mediates the relationship of gender to pain and pain-related outcomes in osteoarthritis patients. Pain 87:325-334.

Keefe FJ, Affleck G, Lefebvre J, Underwood L, Caldwell DS, Drew J, **Egert JR**, Gibson J, Pargament K (2001). Coping with arthritis pain: The role of daily spirituality and daily religious and spiritual coping. Journal of Pain 2(2):101-110.

Egert JR, Keefe FJ, Winer E, Rimer B. (submitted) Coping and social support as predictors of positive dimensions of psychological well-being among women who completed treatment for early stage breast cancer.

Egert JR, Keefe FJ, Winer E, Rimer B. (submitted) Re-defining a "Good adjustment" to cancer: psychological well-being, coping and social support following breast cancer treatment.

YEAR 2:

Egert JR, Winer E, Smith MY, Rimer B, Winkel G, Keefe FJ. (2001). Psychological well-being, distress and quality of life following treatment for early stage breast cancer. (submitted to Annals of Behavioral Medicine).

Smith MY, **Egert JR**, Winkel G, Jacobson J. (2001). Post-traumatic stress disorder and pain symptoms in persons with HIV/AIDS: A prospective study. (submitted to Pains).

Egert JR, Keefe FJ, Winer E, DuHamel K. (2001). Purpose in life, social support and distress among early stage breast cancer survivors. Paper presentation at the 2001 Conference of the Society of Behavioral Medicine in Seattle, Washington.

Egert JR, Duhamel K, Carapetyan KJ, Smith M. (2001). Resiliency and Adjustment to Living with Breast Cancer. Poster presentation at the 2001 Conference of the Society of Behavioral Medicine in Seattle, Washington.

Smith M, **Egert JR**, Jacobson J. (2001). Posttraumatic stress disorder in low-income persons with HIV/AIDS (PWHAs) experiencing persistent pain. Citation paper presented at the 2001 Conference of the Society of Behavioral Medicine in Seattle, Washington.

DR. JOSEPHINE GUEVARRA:

YEAR 1:

Guevarra JS, Bovbjerg DH, Valdimarsdottir HB (2000). African American acculturation and breast self-examination frequency. Poster accepted to the American Psychosomatic Society 58th Annual Scientific Meeting, March 2000, held in Savannah, GA.

Guevarra JS, Bovjberg DH, Valdimarsdottir HB (2000). Role of African-American Acculturation in breast self-examination frequency. Poster accepted to the 7th Biennial Symposium on Minorities, the Medically Underserved and Cancer, February 2000, held in Washington, DC.

Bovbjerg DH, Valdimarsdottir HB, **Guevarra JS**, Godfrey D, Freeman HP. (2000). Psychobiological stress of familial breast cancer risk among African-American women. Poster accepted to the 2000 Society of Behavioral Medicine Conference held March 2000, in San Diego, CA.

Guevarra JS, Tang TS, Valdimarsdottir HB, Freeman HP, Bovbjerg DH. (submitted). Further psychometric validation of the African American Acculturation scale and its relationship to breast self-examination frequency.

Thompson HS, Valdimarsdottir HB, **Guevarra JS**, Duteau-Buck C, Richmond-Avellaneda C, Amarel D, Godfrey D, Scheueer L, Offit K. (submitted). Psychosocial barriers to genetic counseling and testing in African American women.

DR. TRICIA TANG:

YEAR 1:

Guevarra JS, **Tang TS**, Valdimarsdottir HB, Freeman HP, Bovbjerg DH. (submitted). Further psychometric validation of the African American acculturation scale and its relationship to breast self-examination frequency.

Tang TS, Solomon LJ, McCracken LM. Race and cancer screening: Is there a mediating relationship? Poster presented at the 2000 Society of Behavioral Medicine Conference, Nashville TN, April 6, 2000.

Tang TS, Solomon LJ, McCracken LM. Barriers to breast cancer screening among older Chinese women. Poster presented at the 7th biennial Symposium on Minorities, the Medical Underserved and Cancer Conference, Washington, DC, February 12, 2000.

Tang TS, Solomon LJ, Matthews AK. Barriers to colorectal cancer screening among Chinese women 60 and older. Poster presented at the Association of Advancement in Behavior Therapy Conference. Toronto, Canada, November 12, 1999.

Tang TS, Solomon LJ, McCracken LM. Barriers to mammography, clinical breast examination and breast self-examination among Chinese women 60 and older. Poster presented at the Association of Advancement in Behavior Therapy Conference, Toronto, Canada, November 12, 1999.

Tang TS, Solomon LJ, McCracken LM. Race and cancer screening: Is there a mediating relationship? Poster presented at the 2000 Society of Behavioral Medicine Conference, Nashville TN, April 6, 2000.

McCracken LM, Matthews AK, **Tang TS**, Cuba SL (submitted). Sociocultural influences on the experience of chronic pain: Do African-American patients adjust differently compared to European Americans?

DR. KIM YOUNGMEE:

YEAR 1

Kim Y, Morrow G. (submitted).The effect of changes in family environment on the side effects of chemotherapy: Age and gender differences. Psycho-Oncology.

Kim Y, Kasser T, Lee H. (submitted). Self-concept, aspiration, and well-being in Korea and the United States. Personality and Social Psychology Bulletin.

Kim Y, Seidlitz L, Ro Y, Evinger J, Duberstein PR. (Submitted). Spirituality and affect: A lifecourse perspective. Journal for Scientific Studies of Religion.

Kim Y, Deci EL, Zuckerman M. (revised and submitted). The self-regulation of withholding negative emotions: Development of a questionnaire. Educational and Psychological Measurement.

Kim Y, Seidlitz L. (revised and submitted). Spirituality moderates the effect of stress. Personality and Individual Differences.

Kim Y, Duberstein PR. (2001). Depression of spouses of patients with lung cancer: social support, personality, and caregiving burden. Annals of Behavioral Medicine 23:S122.

Kim Y, Morrow GR, Roscoe JA, Hickock J. (2001). Inhibiting development of anticipatory nausea symptoms: The effects of family support, patient's anxiety, and post-treatment nausea. Annals of Behavioral Medicine 23:S123.

9. CONCLUSIONS: N/A

doi: 10.1054/ bjoc.2000.1476, available online at http://www.idealibrary.com on IDEAL®

Short Communication

Lactose and benign ovarian tumours in a case–control study

JA Britton[1], C Westhoff[2,3], GR Howe[3] and MD Gammon[4]

[1]Division of Environmental Health Science, Mt. Sinai School of Medicine, 1 Gustave L. Levy Place, Box 1057, New York, NY 10029; [2]Department of Obstetrics & Gynecology, College of Physicians and Surgeons, Columbia University, New York, NY 10032; [3]Division of Epidemiology, Joseph L. Mailman School of Public Health, Columbia University, New York, NY 10032; [4]Department of Epidemiology, School of Public Health, University of North Carolina, Chapel Hill, NC 27599

Summary We investigated the relation between benign ovarian tumours and lactose among 746 case women identified at seven New York metropolitan hospitals and 404 community controls, age and hospital frequency matched to the expected case distribution. No increase in risk was found for lactose (highest quartile versus lowest: adjusted odds ratio = 0.82 (95% CI 0.57–1.20) or for any other lactose foods.

Keywords: case–control studies; diet; lactose; nutrition; ovarian neoplasms; risk factors

Galactose levels are determined by dietary sources (primarily lactose) and metabolism-related factors. The theory linking galactose to ovarian cancer aetiology originates from galactosaemia, which is characterized by the absence of transferase. Some galactosaemics experience ovarian failure or have elevated gonadotropins levels (Kaufman et al, 1981), which may increase ovarian cancer risk (Gardner, 1961; Cramer and Welch, 1983). An increased ovarian cancer risk has been reported with higher lactose intakes and with a higher lactose to transferase activity ratio (Cramer et al, 1989).

The surgical diagnosis of benign epithelial tumours declines at ages when epithelial ovarian cancer incidence increases, suggesting that a small proportion of BOTs may progress to their invasive malignant counterparts (Bennington et al, 1968). This is consistent with observations of benign neoplasia located adjacent to or within ovarian cancers (McKay, 1962; Puls et al, 1992), and of benign to malignant epithelium histologic transition in one-quarter of a sample of ovarian cancers (Puls et al, 1992). Thus, benign and malignant ovarian tumours may share a common aetiology, and if so, they afford an opportunity to investigate potential risk factors closer to the time of aetiologic interest.

MATERIALS AND METHODS

Methods of this study have been described in more detail elsewhere (Westhoff et al, 2000). In this study English-speaking women, aged 18 to 74, with a telephone, residing in the New York metropolitan area within 50 miles of a participating hospital, having an ovary and not having a malignant tumour were eligible. Institutional review boards approved the study protocols.

Received 5 April 2000
Revised 2 August 2000
Accepted 3 August 2000

Correspondence to: JA Britton

BOT cases were diagnosed in 1992 and 1993. A uniform pathology review determined eligibility and histologic classification (Russell and Bannatyne, 1989). Controls, frequency-matched to the expected case distribution by 10-year age group and hospital, were identified using Waksberg's random digit dialing (RDD) method (Waksberg, 1978; Hartge et al, 1984). Participation rates among the cases and controls were 80.7% (n = 746) and 71.4% (n = 404), respectively. RDD screener response rate was 84.9%.

A structured questionnaire was administered. A 127-item Willett food frequency questionnaire (FFQ) (Willett, 1990) about usual dietary intake during the 12 to 24 months before interview was self-completed by 90% (n = 673) of the cases and 87% (n = 352) of the controls (Britton et al, 2000). Primary lactose foods included skim or low-fat milk, whole milk, cream, sour cream, sherbet or ice milk, ice cream, yogurt, cottage or ricotta cheese, cream cheese, and other cheeses such as American or cheddar cheese.

Median lactose intakes were compared by the Wilcoxon test (Conover, 1980). Unconditional logistic regression produced adjusted odds ratios (ORs) and 95% confidence intervals (CIs) (Hosmer and Lemeshow, 1989). Controls were compared to all cases and to the more common histologic sub-types: endometriomas, serious adenomas and teratomas.

Lactose (grams per day) was considered as a continuous and categorical variable (classified into quartiles). The residual nutrient method was used for the latter (Willett et al. 1997). Foods were divided into three categories according to the control frequency distribution. In the models, categorical variables were represented as indicator variables and adjustment was made for age (<25/25–34/35–44/45–54/55–64/65+ years), hospital (seven categories), total energy (kilocalories per day), and body mass index (BMI: weight in kilograms/height in metres squared) for the year prior to interview. When dietary fat and non-dietary factors were considered as confounders, estimates were unaffected thus subsequent models omitted these factors. To assess trends, quartile levels or indicator variable scores were entered in models as ordinal variables.

Table 1 Odds ratios and 95% confidence intervals for benign ovarian tumours, according to lactose intake as categorized by quartiles, among 1015 women in the New York Metropolitan Area, 1992–1993

	Controls	Endometrioma[b]			Mucinous adenoma			Serous adenoma			Teratoma[b]			All cases[b]		
Exposure	**(no.)[a]**	**(no.)**	**OR[a,c]**	**95% CI[a]**	**(no.)**	**OR[c]**	**95% CI**	**(no.)**	**OR[c]**	**95% CI**	**(no.)**	**OR[c]**	**95% CI**	**(no.)**	**OR[c]**	**95% CI**
Quartiles of lactose intake (grams)																
Q1 (≤5.58)	86	72	1.00		15	1.00		51	1.00		38	1.00		174	1.00	
Q2 (5.59–10.42)	87	77	1.11	0.69–1.79	14	0.97	0.41–2.28	30	0.61	0.34–1.10	36	1.01	0.56–1.81	161	0.93	0.63–1.36
Q3 (10.43–17.11)	88	74	1.06	0.66–1.70	20	1.37	0.62–3.02	51	1.08	0.63–1.83	50	1.37	0.79–2.38	185	1.04	0.71–1.52
Q4 (>17.11)	86	57	0.77	0.48–1.26	11	0.75	0.31–1.79	40	0.78	0.45–1.35	41	1.05	0.61–1.83	148	0.82	0.57–1.20
P for trend			0.31			0.77			0.82			0.60			0.46	

[a]no., number of subjects; OR, Odds ratio; CI, Confidence interval. [b]One woman with a teratoma and one with an endometrioma with missing information on body mass index (weight in kilograms/height in metres squared) were excluded from the logistic models. [c]Adjusted for age, hospital, total caloric intake, and body mass index for the year prior to interview.

Table 2 Odds ratios and 95% confidence intervals for benign ovarian tumours in relation to lactose-food items, among 1015 women in the New York Metropolitan Area, 1992–1993

	Controls	Endometrioma[b]			Serous adenoma			Teratoma[b]			All cases[b]		
Exposure	**(no.)[a]**	**(no.)**	**OR[a,c]**	**95% CI[a]**	**(no.)**	**OR[c]**	**95% CI**	**(no.)**	**OR[c]**	**95% CI**	**(no.)**	**OR[c]**	**95% CI**
Whole milk (8 oz or 236.8 ml)[a]													
Never or <1/month	191	168	1.00		115	1.00		112	1.00		429	1.00	
1/month–≤1/week	75	58	0.81	0.54–1.24	20	0.51	0.29–0.91	23	0.48	0.28–0.83	112	0.68	0.48–0.95
2+/week	68	47	0.82	0.52–1.28	24	0.69	0.39–1.20	26	0.59	0.34–1.01	102	0.69	0.48–0.99
Not ascertained	13	7			13			4			25		
P for trend			0.29			0.07			0.01			0.02	
Skim/low-fat milk (8 oz or 236.8 ml)													
Never or <1/month	132	90	1.00		61	1.00		50	1.00		224	1.00	
1/month–≤1/week	57	48	1.26	0.77–2.06	26	0.99	0.55–1.78	28	1.28	0.72–2.28	102	1.03	0.69–1.53
2+/week	152	137	1.25	0.86–1.81	79	1.13	0.74–1.75	84	1.43	0.92–2.22	328	1.21	0.90–1.63
Not ascertained	6	5			6			3			14		
P for trend			0.26			0.56			0.11			0.20	
Yogurt (1 c or 226.8 g)[a]													
Never or <1/month	116	94	1.00		51	1.00		60	1.00		222	1.00	
1/month–≤ 1/week	126	120	1.15	0.79–1.70	64	1.25	0.77–2.01	60	0.89	0.56–1.39	262	1.08	0.79–1.48
2+/week	101	65	0.84	0.54–1.30	52	1.20	0.73–1.98	44	0.79	0.49–1.29	172	0.86	0.61–1.21
Not ascertained	4	1			5			1			12		
P for trend			0.52			0.48			0.35			0.44	

[a]no., number of subjects; OR, odds ratio; CI, confidence interval; ml, millilitres; g, grams; oz, ounces; c, cups. [b]One woman with a teratoma and one with an endometrioma with missing information on body mass index (weight in kilograms/height in metres squared) were excluded from the logistic models. [c]Adjusted for age, hospital, total caloric intake, and body mass index for the year prior to interview.

RESULTS

After exclusion of 1% of cases and controls with extreme energy intake (Howe et al, 1990; Hunter et al, 1996) 668 case women and 347 control women remained. Women could have multiple tumours of differing histology as a result the cases were diagnosed with 717 BOTs: 172 serous, 60 mucinous, 280 endometrioid, and 8 Brenner tumours, as well as 165 teratomas and 32 fibroma-thecomas. All women (Westhoff et al, 2000) and those providing dietary information (Britton et al, 2000) had similar distributions of demographic and other characteristics. In general, controls were significantly more likely than cases to be parous and to have a non-private or no health care provider, a possible indicator of less diagnosis opportunity. Cases were non-significantly more likely to be white, never OC users and have larger BMI. The mean case age of 42.2 years (standard deviation (SD) = 11.9) was slightly older than the mean control age of 41.5 years (SD = 12.5) ($P = 0.4$).

All cases combined and each histologic type, except endometriomas, had non-significantly higher median lactose intakes than controls (data not shown). There was no evidence of an association or a dose–response relation between lactose intake and BOTs or any of the histologic sub-types (Table 1). Continuous lactose measures yielded similar findings; the ORs and 95% CIs per 10 grams of lactose were 0.90 (0.76–1.06), 0.89 (0.65–1.21), 0.96 (0.80–1.16), 1.07 (0.89–1.27), and 0.97 (0.85–1.10), for endometriomas, mucinous adenomas, adenomas, teratomas, and all BOTs combined, respectively.

Only whole milk was associated with BOTs (Table 2). A significant inverse relation was observed for all BOTs combined and for teratoma tumours, while a borderline significant inverse association was noted for tumours. Though these tests are indicative of an inverse trend, the observed association for the middle category of whole milk intake was either the same as or stronger than that observed for the highest category of intake. There were no other statistically significant associations or dose–response

relations for BOTs combined or for the individual histologic subtypes and consumption of any other lactose foods (selected items shown in Table 2).

DISCUSSION

In this study, whole milk was the only item significantly associated with BOTs for which estimates were below the null. Adjustment for total and types of dietary fat as well as lactose did not change the association. Thus, our results do not support an increased BOT risk in relation to the lactose or dietary fat component of dairy products. This agrees with our earlier finding of no relation between BOTs and saturated fat (Britton et al, 2000).

If BOTs share a common aetiology with, or are precursors of malignant tumours, then the suggestion that either lactose or high-fat dairy products (Mettlin and Piver, 1990) increase ovarian cancer risk is not supported by this study. Our null lactose findings are consistent with studies examining borderline (Risch et al, 1996) or malignant ovarian (Engle et al, 1991; Risch et al, 1994a; Herrinton et al, 1995; Mink et al, 1996; Webb et al, 1998) tumours, but contrast the findings of an elevated ovarian cancer risk in relation to lactose intake (Cramer et al, 1989) or in relation to the lactose to transferase ratio (Cramer et al, 1989). Lactose consumption relative to metabolic capability may be a more relevant measure of galactose exposure but information on transferase activity or lactose tolerance was not available. Finally, we found a reduced BOT risk associated with higher whole milk consumption. Studies of ovarian cancer risk and either whole milk (Cramer et al, 1984, 1989; Mettlin and Piver, 1990; Ursin et al, 1990; Risch et al, 1994a; Webb et al, 1998; Kushi et al, 1999) or dietary fat (Byers et al, 1983; Shu et al, 1989; Slattery et al, 1989; Tzonou et al, 1993; Rische et al, 1994b; Mink et al, 1996; Webb et al, 1998; Kushi et al, 1999) consumption have inconsistent findings, generally reporting no association or an elevated risk.

Participants in health-related studies might be more health conscious and therefore more likely to consume or report low-fat foods. This, coupled with the lower control response rate, could result in selection bias. Or, cases may be more motivated to provide truthful responses than controls, resulting in recall bias. These biases would result in an underestimation of low-fat, but an overestimation of high-fat, food associations. In light of the null findings, it is hard to conceive that these biases are selectively affecting low-fat food associations. Lactose findings should be unaffected because the lactose and fat content of foods are independent.

We assessed commonly eaten major and minor lactose sources enabling us to rank participants' lactose exposure. The foods assessed were similar to the short list of items examined in a study reporting a high correlation ($r = 0.96$) between lactose estimated using 34 versus 7 lactose foods (Cooper et al, 1995). Among controls the expected ethnic/racial variation in lactose intake was observed (Scrimshaw and Murray, 1988). These findings, together with the similar mean lactose intakes for our white controls and those in another study (Cramer et al, 1989), lend credence to our lactose measure.

Overall the study's findings do not support an elevated BOT risk in relation to lactose and are consistent with the results of most of the ovarian cancer studies (Engle et al, 1991; Risch et al, 1994a, 1996; Herrinton et al, 1995; Mink et al, 1996; Webb et al, 1998). The failure to detect an association might reflect a lack of power particularly in the histologic sub-type analyses. Finally, the reduction in BOT risk for greater whole milk intake could be a chance finding given the multiple comparisons made.

ACKNOWLEDGEMENTS

Study funding was provided by National Cancer Institute grant #CA50658. The authors would like to acknowledge the work of Dr Tom Wright, the study pathologist, who reviewed all pathology reports referencing the ovary to determine potentially eligible women. A second review of the slides was conducted to verify eligibility and to classify the tumour histology type.

REFERENCES

Bennington JL, Ferguson BR and Haber SL (1968) Incidence and relative frequency of benign and malignant ovarian neoplasms. *Obstet Gynecol* **32**: 627–632

Britton JA, Westhoff C, Howe GR and Gammon MD (2000) Diet and benign ovarian tumors. *Cancer Causes & Control* **11**: 389–401

Byers T, Marshall J, Graham S, Mettlin C and Swanson M (1983) A case-control study of dietary and nondietary factors in ovarian cancer. *J Natl Cancer Inst* **71**: 681–686

Conover WJ (1980) *Practical Nonparametric Statistics*. John Wiley & Sons, Inc. New York

Cooper GS, Busby MG and Fairchild AP (1995) Measurement of lactose consumption reliability and comparison of two methods. *Ann Edidemiol* **5**: 473–477

Cramer DW and Welch WR (1983) Determinants of ovarian cancer risk. II. Inferences regarding pathogenesis. *J Natl Cancer Inst* **71**: 717–721

Cramer DW, Welch WR, Hutchison GB, Willett W and Scully RE (1984) Dietary animal fat in relation to ovarian cancer risk. *Obstet Gynecol* **63**: 833–838

Cramer DW, Harlow BL, Willett WC, Welch WR, Bell DA, Scully RE, Ng WG and Knapp RC (1989) Galactose consumption and metabolism in relation to the risk of ovarian cancer. *Lancet* **2**: 66–71

Engle A, Muscat JE and Harris RE (1991) Nutritional risk factors and ovarian cancer. *Nutr Cancer* **15**: 239–247

Gardner WU (1961) Tumorigenesis in transplanted irradiated and nonirradiated ovaries. *J Natl Cancer Inst* **26**: 829–853

Hartge P, Brinton LA, Rosenthal JF, Cahill JI, Hoover RN and Waksberg JS (1984) Random digit dialing in selecting a population-based control group. *Am J Epidemiol* **120**: 825–833

Herrinton LJ, Weiss NS, Beresford SA, Stanford JL, Wolfla DM, Feng Z and Scott CR (1995) Lactose and galactose intake and metabolism in relation to the risk of epithelial ovarian cancer. *Am J Epidemiol* **141**: 407–416

Hosmer DW and Lemeshow S (1989) *Applied Logistic Regression*. John Wiley & Sons, Inc.: New York

Howe GR, Hirohata T, Hislop TG, Iscovich JM, Yuan J-M, Katsouyanni K, Lubin F, Marubini E, Modan D, Rohan T, Toniolo P and Shunzhang Y (1990) Dietary factors and risk of breast cancer: combined analysis of twelve case-control studies. *J Natl Cancer Inst* **82**: 561–569

Hunter DJ, Spiegelman D, Adami H, Beeson L, van den Brandt PA, Folsom AR, Fraser GE, Goldbohm A, Graham S, Howe GR, Kushi LH, Marshall JR, McDermott A, Miller AB, Speizer FE, Wolk A, Yaun S and Willett W (1996) Cohort studies of fat intake and the risk of breast cancer – a pooled analysis. *N Engl J Med* **334**: 356–361

Kaufman FR, Kogut MD, Donnell GN, Goebelsmann U, March C and Koch R (1981) Hypergonadotropic hypogonadism in female patients with galactosemia. *N Engl J Med* **304**: 994–998

Kushi LH, Mink PJ, Folsom AR, Anderson KE, Zheng W, Lazovich D and Sellers TA (1999) Prospective study of diet and ovarian cancer. *Am J Epidemiol* **149**: 21–31

McKay DG (1962) The origins of ovarian tumors. *Clin Obstet Gynecol* **5**: 1181–1197

Mettlin CJ and Piver MS (1990) A case-control study of milk-drinking and ovarian cancer risk. *Am J Epidemiol* **132**: 871–876

Mink P, Kushi LH, Sellers T, Sheng W and Folsom A (1996) Dietary risk factors for ovarian cancer: A prospective study of older women (Abstract). *Am J Epidemiol* **143**: S59

Puls LE, Powell DE, DePriest PD, Gallion HH, Hunter JE, Kryscio RJ and van Nagell JR (1992) Transition from benign to malignant epithelium in mucinous and serous ovarian cystadenocarcinoma. *Gynecol Oncol* **47**: 53–57

Risch HA, Jain M, Marrett LD and Howe GR (1994a) Dietary lactose intake, lactose intolerance, and the risk of epithelial ovarian cancer in southern Ontario (Canada). *Cancer Causes & Control* **5**: 540–548

Risch HA, Jain M, Marrett LD and Howe GR (1994b) Dietary fat intake and risk of epithelial ovarian cancer. *J Natl Cancer Inst* **86**: 1409–1415

Risch HA, Marrett LD, Jain M and Howe GR (1996) Differences in risk factors for epithelial ovarian cancer by histologic type results of a case-control study. *Am J Epidemiol* **144**: 363–372

Russell P and Bannatyne P (1989) *Surgical Pathology of the Ovaries*. Churchill Livingstone: Edinburgh

Scrimshaw NS and Murray EB (1988) The acceptability of milk and milk products in populations with a high prevalence of lactose intolerance. *Am J Clin Nutr* **48**: 1079–1159

Shu XO, Gao YT, Yuan JM, Ziegler RG and Brinton LA (1989) Dietary factors and epithelial ovarian cancer. *Br J Cancer* **59**: 92–96

Slattery ML, Schuman KL, West DW, French TK and Robison LM (1989) Nutrient intake and ovarian cancer. *Am J Epidemiol* **130**: 497–502

Tzonou A, Hsieh CC, Polychronopoulou A, Kaprinis G, Toupadaki N, Trichopoulou A, Karakatsani A and Trichopoulos D (1993) Diet and ovarian cancer: a case-control study in Greece. *Int J Cancer* **55**: 411–414

Ursin G, Bjelke E, Heuch I and Vollset SE (1990) Milk consumption and cancer incidence: a Norwegian prospective study. *Br J Cancer* **61**: 454–459

Waksberg JS (1978) Sampling methods for random digit dialing. *Journal of the American Statistical Association* **73**: 40–46

Webb PM, Bain CJ, Purdie DM, Harvey PW and Green A (1998) Milk consumption, galactose metabolism and ovarian cancer (Australia). *Cancer Causes Control* **9**: 637–644

Westhoff C, Britton JA, Gammon MD, Wright T and Kelsey JL (2000) Oral contraceptives and benign ovarian tumors. *Am J Epidemiol* **152**: 242–246

Willett W (1990) *Nutritional Epidemiology*. Oxford University Press, Inc.: New York

Willett WC, Howe GR and Kushi LH (1997) Adjustment for total energy intake in epidemiologic studies. *Am J Clin Nutr* **65**: 1220S–1228S

UNDER REVIEW AT ANNALS OF BEHAVIORAL MEDICINE

Psychological Well-being, Distress, and Quality of Life Following Treatment for Early Stage Breast Cancer

Jennifer R. Egert, Ph.D., Mount Sinai School of Medicine

Eric P. Winer, M.D., Dana-Farber Cancer Institute and Brigham and Women's Hospital

Meredith Y. Smith, Ph.D., M.P.A., Mount Sinai School of Medicine

Gary Winkel, Ph.D., The Graduate School and University Center of the City University of New York

Barbara K. Rimer, Dr.P.H., Division of Cancer Control and Population Sciences, National Cancer Institute

Francis J. Keefe, Ph.D., Duke University Medical Center

Abstract

Growing recognition in the contribution of the field of "positive psychology" has motivated researchers to expand models of cancer adjustment to include more positive dimensions of psychosocial functioning. The present study examines the construct of "psychological well-being" (PWB) within the context of breast cancer. Utilizing Ryff's model and measure of well-being, we sought to: 1) evaluate PWB as a unique aspect of breast cancer adjustment, and 2) test a directional model of PWB's relationship to psychological distress and breast cancer-related quality of life (BC-QOL). Participants were 113 women who completed treatment for early stage breast cancer. Confirmatory factor analyses supported the hypothesized model of adjustment where PWB was related, though distinct from measures of distress and BC-QOL (Standardized Root Mean Square Residual (SRMSR) = 0.065, Root Mean Square of Error Approximation (RMSEA) = 0.063, Comparative Fit Index (CFI) = 0.95). Path analyses supported a directional model whereby PWB had a positive, direct relationship to BC-QOL and an indirect relationship via the reduction of distress (SRMSR = 0.065; RMSEA = 0.063; CFI = 0.95). Our findings indicate that measures of PWB offer unique information about breast cancer adjustment and should be included as part of clinical or research based assessments.

UNDER REVIEW AT "PAIN"

Posttraumatic Stress Disorder and pain symptoms in persons with HIV/AIDS: a prospective study

Meredith Y. Smith, Ph.D., M.P.A.
Jennifer Egert, Ph.D.
Gary Winkel., Ph.D.
Jeffrey Jacobson, M.D.

Abstract

Pain is a common and persistent symptom for persons infected with the human immunodeficiency virus (HIV), resulting most frequently from the direct effects of HIV on the central or peripheral nervous system, opportunistic infections associated with immune suppression, or from highly active antiretroviral therapy usage. A growing body of data suggest that chronic pain is associated with posttraumatic stress disorder (PTSD), an anxiety condition which develops following exposure to a traumatic event. Individuals reporting high levels of PTSD symptoms have been found to experience greater pain intensity and pain-related disability than those with few or no PTSD symptoms. The purpose of this study was to assess the relationship of PTSD to pain intensity and pain-related interference prospectively among HIV-infected persons reporting chronic pain. Study participants included 145 ambulatory PWHAs who were enrolled in a randomized, longitudinal clinical trial testing the impact of a pain communication intervention. Participants completed a series of self-report measures including the Stressful Life Events Checklist, the Posttraumatic Stress Disorder Checklist-Civilian, the Mental Health Inventory, and the Brief Pain Inventory. Participants reported experiencing an average of 6.3 different types of which receiving an HIV diagnosis was rated as being among the most stressful. Over half (53.8 percent) merited a likely PTSD diagnosis. Those potentially meriting a PTSD diagnosis reported significantly higher pain intensity and greater pain-related interference in daily living over time than those who failed to meet diagnostic criteria. Results suggest that PWHAs with chronic pain should be routinely assessed for PTSD symptomatology.

POSTTRAUMATIC STRESS DISORDER IN LOW-INCOME PERSONS WITH HIV/AIDS (PWHAs) EXPERIENCING PERSISTENT PAIN

Meredith Smith, Ph.D., M.P.A., Jennifer Egert, Ph.D., Jeffrey Jacobson, M.D., Mount Sinai School of Medicine.

Background: Persons with HIV/AIDS increasingly include the most socio-economically disadvantaged and as such are especially vulnerable to trauma exposure and subsequent PTSD onset. Although PTSD has been shown to be an important correlate of physical complaints such as pain, little is known about its prevalence among low-income PWHAs and how PTSD symptoms relate to self-reported pain and pain-related interference with daily living activities.
Method and Sample Characteristics: 145 low-income adult PWHAs experiencing moderate to severe pain were assessed using the Stressful Life Experiences Screening, the Posttraumatic Stress Disorder Checklist-Civilian, the MOS SF-12, the Mental Health Inventory, and the Brief Pain Inventory. The majority were either Hispanic (54%) or African-American (42%), and male (59.3%). Average worst pain rating over the past fortnight was 7.36 (SD=2.92) on a scale of 0 (none) to 10 (worst imaginable).
Results and Implications: Participants reported experiencing an average of 6.3 (SD=3.2) types of trauma. 49.3% rated HIV diagnosis as being the most stressful experience currently. 53.8% met PTSD diagnostic criteria . Using multiple regression analysis and after controlling for CD4 count, higher PTSD symptom level predicted higher worst pain intensity ($F(3,120)=5.09$, $p<.002$); higher average pain over past two weeks ($F(3,120)=5.33$, $P=.002$); and greater pain-related interference in general activity performance ($F(3,120)=4.59$, $p=.004$), mood ($F(3,120)=4.23$, $p=.007$), relations with others ($F(3,12)=7.20$, $p<.0001$), sleep ($F(3,120)=2.6$, $p=.055$), and enjoyment of life ($F(3,120)=7.87$, $p<.0001$). Results show that low-income PWHAs with pain have high levels of PTSD symptoms and that as symptom burden increases, pain intensity and pain-related interference with functioning rises commensurately.

Meredith Y. Smith, Ph.D., M.P.A., Mount Sinai School of Medicine, 1 Gustave L. Levy Place, Box 1130, New York, NY 10029, USA. meredith.smith@mountsinai.edu

PURPOSE IN LIFE, SOCIAL SUPPORT, AND DISTRESS AMONG EARLY STAGE BREAST CANCER SURVIVORS

Jennifer R. Egert, Ph.D., Mount Sinai School of Medicine, NY, NY; Francis J. Keefe, Ph.D., Duke University Medical Center, Durham, NC; Eric P. Winer, M.D. Dana-Farber Cancer Institute & Brigham and Women's Hospital, Boston, MA; Katherine DuHamel, Ph.D., Mount Sinai School of Medicine, NY, NY.

Past research has repeatedly demonstrated significant benefits of social support for managing the stress of breast cancer. However, less is known about why social support is beneficial. Recent studies have also demonstrated that meaning or purpose in life is another important contributor to levels of distress among cancer patients. Given this past research, we sought to evaluate whether purpose in life mediated the relationship between social support and distress among early stage breast cancer survivors. In total, 113 women who successfully completed treatment for early stage breast cancer participated in telephone interviews and completed mailed, self-report measures of breast cancer related social support (BCSS) (Northhouse's Questionnaire), purpose in life (PIL) (Ryff's Scales) and psychological distress (Brief Symptom Inventory-Global Severity Index). A hierarchical regression model was run, first entering age, education, and disease stage; second, adding BCSS; and third, PIL was entered. Results indicated that before PIL was entered in the model, BCSS significantly contributed to explaining variance in distress (Standardized Beta = -.278, $p<.002$). However, after PIL was entered, BCSS no longer contributed significantly to the model (PIL Standardized Beta = -.377, $p<.0001$) (Final model R-square = .366, $p< .0001$). These findings support the study hypothesis and suggest that one route through with social support benefits breast cancer survivors is through the facilitation of a sense of purpose in life.

Jennifer R. Egert, Ph.D., Mount Sinai School of Medicine, One Gustave L. Levy Place, Box 1130, NY, NY 10029, USA. jegert@email.msn.com

RESILIENCY AND ADJUSTMENT TO LIVING WITH BREAST CANCER

Jennifer R. Egert, Ph.D., Katherine DuHamel, Ph.D., Karen J. Carapetyan, M.A., Meredith Smith, Ph.D., M.P.A., Mount Sinai School of Medicine

Individuals who show self-reliance, are able to meet the demands of their environment, form positive relationships with others and have a sense of purpose in life are likely to manage stressful experiences such as a life-threatening illness better that those without such resiliency. This study examined the relationship of these four resiliency characteristics to adjustment in 27 breast cancer patients participating in a clinical trial aimed at improving pain management for which recruitment is ongoing. Participants were assessed at baseline in terms of resiliency characteristics (Ryff's Scales of Psychological Well-Being) and positive and negative psychological states (the Mental Health Index) such as feeling calm and cheerful versus anxious and depressed. The mean age of participants was 50.89 (sd = 8.57) and 59% had metastatic disease. Participants were primarily minority (48% Hispanic; 22% African American) and 26% had not completed high school. Regression analyses revealed that, after accounting for disease stage and average pain level over the prior two weeks, the four resiliency characteristics contributed significantly to explaining variation in positive psychological state (change in R-square = .37, p = .005) but not in negative psychological state. These findings support past research indicating that positive and negative psychological states may have different correlates. Interventions which target these specific resiliency characteristics may facilitate positive psychological adjustment but may not alleviate distress. Further longitudinal research is needed to evaluate causal relationships among resiliency characteristics and cancer adjustment.

Jennifer R. Egert, Ph.D., Mount Sinai School of Medicine, One Gustave L. Levy Place, Box 1130, New York, NY 10029, USA. E-mail: jegert@email.msn.com

The Effect of Change in Family Environment on the Side Effects of Receiving Chemotherapy: Age and Gender Differences

Youngmee Kim and Gary R. Morrow

University of Rochester School of Medicine

Running Head: Changes in Family Environment and Side Effects of Chemotherapy

Correspondence to: Youngmee Kim, Ph.D.

Cancer Prevention and Control

Mount Sinai School of Medicine

One Gustave L. Levy Place, Box 1130

New York, NY 10029-6574

Telephone: (212) 659-5646 Fax: (212) 849-2564

E-mail: youngmee.kim@mssm.edu

Abstract

This study examined the effect of change in family environment on patients' physical adjustment to chemotherapy and whether the effect would differ depending on the patient's age and gender. Three hundred twenty eight patients with cancer completed a questionnaire assessment, including the Family Environment Scale and a rating list of side effects of chemotherapy, such as nausea and other physical symptoms, at their second and fifth treatments. The prevalence of side effects was found to be related to family environment. The relations depended more on the patient's age than on gender. For younger patients, an increase in family conflict and a decrease in family organization were both associated with increased side effects. In contrast, these factors were associated with decreased side effects in older patients. These findings suggest that intervention programs to help reduce family conflict and improve family organization may be especially beneficial for younger patients.

Key Words: Family Environment, Chemotherapy-Related Side Effects, Age Differences

The Effect of Change in Family Environment on the Side Effects of Receiving Chemotherapy: Age and Gender Differences

Over one million new cancer cases will be diagnosed in the United States in the year 2000 and three out of four families will be affected by this disease (American Cancer Society, 2000). While cancer has been viewed as a problem that involves the entire family, few studies examined the impact of family environment on the patient's adjustment to disease.

During the diagnosis and treatment of cancer, families are expected to provide emotional, financial, and informational support to the patients (Jacobs, Ostroff, & Steinglass, 1998) and to enhance the patients' adjustment. For example, a number of studies have found that a patient's psychological adjustment to cancer is better in a family characterized by cohesion, open expression, and absence of conflict (Baider, Koch, & De-Nour, 1998; Carter & Carter, 1993; Fobair & Zabora, 1995; Friedman et al., 1988; Friedman, Lehane, Webb, Weinberg, & Cooper, 1994; Koopman, Hermanson, Diamond, Angell, & Spiegel, 1998; Mesters et al., 1997; Molassiotis, van den Akker, & Boughton, 1997; Northouse, 1995; Spiegel, Bloom, & Gottheil, 1983). In addition, such family characteristics have been associated with fewer chemotherapy-related symptoms, such as fatigue and nausea (Bloom, 1982; Friedman et al., 1988; Friedman et al., 1994; Jamison, Burish, & Wallston, 1987; Mesters et al., 1997; Peters-Golden, 1982; Spiegel et al., 1983; Williams, 1989). The family's flexibility in role assignments and how the family is structured also influence the patient's ability to adapt to the demands of cancer and its treatment (Moos & Moos, 1986; Williams, 1989).

Although family environment is generally viewed as a stable characteristic, a major stressor, such as the occurrence of cancer in a family member, can alter familial relationships and system equilibrium (Lederberg, 1998). Indeed, family systems theory (Steinglass, 1987) highlights the dynamic between a family's growth tendency to become structurally more complex and its regulatory tendency to remain stable and orderly. In healthy families, the two tendencies are hypothesized to interact consistently to maintain balance. An unbalanced or malfunctioning family environment is associated with increased psychosomatic complaints from family members in healthy populations (Holahan & Moos, 1986).

As Spiegel and Kato (1996) point out in their review of studies on social support and cancer progression, most studies have used one-time assessments of social support to predict later disease outcome. While such a design can uncover associations, it is not useful for clarifying causal relationships. Thus, the present study examines the role of changes in family environment at two different points of treatment (cycle two and five) on a patient's physical adjustment to chemotherapy, using a prospective design.

Among side effects of chemotherapy, nausea, which is a subjective, unpleasant feeling that may trigger vomiting, is one of the most frequently reported and troublesome adverse side effects (Morrow, Roscoe, & Hickok, 1998). Over 60% of patients develop nausea after treatment (post-treatment nausea) and 25% of patients develop nausea prior to receiving treatment (anticipatory nausea) (Morrow & Roscoe, 1997). Both forms of chemotherapy-related nausea can potentially affect a patient's prognosis when they lead to or exacerbate nutritional problems, making them so severe that chemotherapy is

discontinued, potentially resulting in disease progression (Newell, Sanson-Fisher, Girgis, & Bonaventura, 1998).

Physical weaknesses, including blurry vision, dizziness, muscle twitching, and unsteady gait, have also been cited as common side effects of chemotherapy (Brophy & Sharp, 1991; Nail, Jones, Greene, Shipper, & Jensen, 1991; Nail & Winningham, 1995; Sitzia, Hughes, & Sobrido, 1995; St. Pierre, Kasper, & Lindsey, 1992; Yellen, Cella, Webster, Blendowski, & Kaplan, 1997). These symptoms have been associated with poor quality of life (Brophy & Sharp, 1991; Butow, Coates, Dunn, Bernhard, & Hurny, 1991; Chang, Hwang, Feuerman, & Kasimis, 2000), independent of psychological distress (Dimeo et al., 1997).

In one study that examined the development of chemotherapy-related nausea, Williams (1989) found that changes in family environment did not significantly correlate with the development of anticipatory nausea. However, it is difficult to draw satisfactory conclusions from this study because only correlational analyses were performed to identify the unique contribution of changes in family environment in the development of nausea, and other side effects were not examined. How changes in a family's environment influence the development of side effects remains unclear.

The relation between changes in family environment and the development of side effects may depend on a patient's age and gender. For example, several studies have found that younger patients report more problems with chemotherapy (Friedman et al., 1994; Ganz, Schag, & Heinrich, 1985; Schag & Heinrich, 1989) and greater difficulty adjusting emotionally (Mor, Allen, & Malin, 1994; Wellisch, Landsverk, Guidera, Pasnau, & Fawzy, 1983). Thus, an increase in family support may be particularly

beneficial to younger patients' adjustment. Although both men and women perceive family support as important resources (Lynch, 1998), the adjustment of female but not of male cancer patients has been associated with social or family support (Ell, Nishimoto, Mediansky, Mantell, & Hamovitch, 1992; Reynolds & Kaplan, 1990). Thus, an increase in family support may be also more beneficial to female than male patients.

We hypothesized that, based on this theory and literature (a) an increase in family support would be associated with a decrease in development of side effects of chemotherapy and (b) this relation would depend on the patient's age and gender, such that younger rather than older and female rather than male patients would benefit more from an increase in family support. These hypotheses were tested in a prospective design.

Method

Participants

Three hundred twenty eight cancer patients (164 males, 164 females), diagnosed with hematologic neoplasms (62%), lung cancer (21%), or alimentary tract cancer (17%) were studied. They were a subset of a larger study (Hickock et al., 1999; Morrow et al., 1998; Roscoe, Morrow, Hickock, & Stern 2000). Mean age of the patients was 56.9 years (range 18 to 89). Most patients were married (71%), Caucasian (93%), and had at least a high school education (84%).

Measures

Family Support. The Family Environment Scale (FES) assesses the environment in which a family creates and imposes expectations and demands for certain behaviors upon its members (Moos & Moos, 1986). It was used in this study to assess the degree to

which a patient perceives support from their family. The FES consists of 10 subscales. Five of the ten subscales (45 items) were specifically selected as measures of supportive family environment. Three of these subscales (cohesion, expressiveness, and conflict) describe characteristics of family relationships. According to Moos and Moos' (1986) definition, cohesion is the degree of commitment, help, and support that family members provide for one another. Expressiveness is the extent to which family members are encouraged to act openly and to express their feelings directly. Conflict is the amount of expressed anger, aggression, and disagreement among family members. Two further subscales (organization and control) are part of a construct domain generally seen as system maintenance. Organization is the degree of importance of clear organization and structure in planning family activities and responsibilities. Control refers to the extent to which set rules and procedures are used to run family life. The test-retest reliability for the ten subscales, based on an eight-week interval, ranged from .68 to .86 (Moos & Moos, 1986). The psychometric properties and validity of the FES have been established (Sanford, Bingham, & Zucker, 1999).

Chemotherapy-Related Nausea. The Morrow Assessment of Nausea and Emesis (MANE: Morrow, 1992) was used to assess nausea, before a treatment infusion (anticipatory) or after a treatment infusion (post-treatment). The MANE is a patient self-report measure completed after each treatment to record severity (measured on a 6 point Likert scale from 0 = "not at all" to 6 = "intolerable") and duration (in hours) of nausea. The scale has been used in over two dozen recent research studies and its psychometric validity and reliability have been established (Carnrike et al., 1988; Morrow, 1992).

Chemotherapy-Related Physical Symptoms. Four common side effects of chemotherapy, unsteady gait, dizziness, muscle twitching, and impaired or blurred vision, were measured on a 3-point scale (1 = absent, 2 = mild, and 3 = marked).

Procedure

Eligible patients were recruited at the time of their first chemotherapy treatment. Participation was voluntary and anonymity was preserved. Patients who consented to join the study signed a consent form, and demographic and clinical data were gathered from medical charts. At the second chemotherapy treatment (before drugs were administered to the patient), the patient completed a questionnaire packet, including the FES, the MANE, and the Physical Symptoms assessment. At the fifth chemotherapy treatment, the patient again completed the questionnaire packet.

Results

Means and standard deviations of the study variables are reported in Table 1. The conflict among family members decreased from the second infusion to the fifth and other sub-domain in family environment remained the same. Physical symptoms, including unsteady gait, dizziness, and muscle twitching, increased, from the second infusion to the fifth.

Insert Table 1 About Here

Study hypotheses were examined using hierarchical regression analyses. The corresponding dependent variable and the five subscale scores of the FES, which were measured at the second infusion, were entered in the first step in order to control the

baseline of the variable. In the second step, the main effects of the study variables were examined by entering the patient's age (-1 for younger and 1 for older patients by median split at age 61) and gender (-1 for males and 1 for females), and the five subscale scores of the FES as measured at the fifth infusion. The main effects of each FES subscale in this step reflect the impact of changes in family environment on a patient's chemotherapy-related side effects, controlling for the patient's initial levels of family environment. Finally, in the third step, two-way interaction terms between age, gender, and the five FES subscale scores which were measured at the fifth infusion were entered into the equation. Estimated linear regression slopes for the dependent variable (Cohen & Cohen, 1983) relevant to either age or gender groups were reported for all significant interaction effects, to help interpret significant interaction effects.

One aspect of family environment (conflict) at the second infusion was found to be associated with changes in a patient's chemotherapy-related side effects over the course of the five infusions (see step 1 row in Table 2). For example, a higher level of conflict at the second infusion was significantly related to increased severity in anticipatory nausea and marginally associated with longer duration of post-treatment nausea at the fifth infusion.

Insert Table 2 About Here

As shown in the step 2 row in Table 2, younger more than older patients reported increased severity and duration of post-treatment nausea and older more than younger patients reported increased unsteady gait. Females more than males reported increased

anticipatory nausea. Increased cohesiveness in the family (cohesiveness at the fifth infusion after controlling for the cohesiveness at the second infusion) was associated with increased severity of anticipatory nausea (severity of anticipatory nausea at the fifth infusion after controlling for anticipatory nausea at the second infusion). This result did not support the study hypothesis that supportive family would be associated with a decrease in development of side effects.

The sub-domains of family environment influenced a patient's physical adjustment to chemotherapy treatments in differing degrees, depending on a patient's age and gender, as shown in the step 3 row in Table 2. First, the impact of *cohesiveness* in the family was not dependent on a patient's age but on a patient's gender. Decreased cohesiveness was associated with increased unsteadiness in females (slope = .25) but not in males (slope = .02); and with decreased muscle twitching in males (slope = -.36), but less so in females (slope = -.15).

Second, the impact of *expressiveness* in the family was dependent on a patient's age but not on a patient's gender. An increase in expressiveness was associated with increased unsteadiness in younger (slope = .24), but not in older (slope = -.02), patients.

Third, the impact of *conflict* in the family was dependent on both a patient's age and gender. Increased conflict was associated with both increased severity (slope = .21) and duration (slope = 5.60) of post-treatment nausea, increased severity of anticipatory nausea (slope = .12), and muscle twitching (slope = .20) in younger patients, while the opposite was true in older patients (slopes = -.14, -1.42, -.07, -.02, respectively). Figure 1 depicts the effect of change in family conflict on the duration of post-treatment nausea as a function of a patient's age. Increased conflict in the family was associated with

increased unsteadiness in older patients (slope = .16), while it was slightly associated with decreased unsteadiness in younger patients (slope = -.06). Increased conflict in the family tended to be associated with an increase in impaired vision in female patients (slope = .12), while it tended to be associated with a decrease in impaired vision in male patients (slope = -.13).

Insert Figure 1 About Here

Fourth, the impact of family *organization* was also dependent on both a patient's age and gender. Decreased family organization was associated with an increase in both duration of post-treatment nausea (slope = 3.14) and unsteadiness (slope = .17) but was not related to impaired vision (slope = .02) in younger patients, while it was associated with a decrease in duration of post-treatment nausea (slope = -3.01), unsteadiness (slope = -.16), and impaired vision (slope = -.25) in older patients. Figure 2 depicts the effect of change in family organization on unsteadiness as a function of a patient's age. Decreased family organization was associated with a decrease in unsteadiness (slope = -12.12) and increased dizziness (slope = .45) in female patients, and with an increase in both unsteadiness (slope = 13.35) and dizziness (slope = .14) in male patients. Figure 3 depicts the effect of change in family organization on dizziness as a function of a patient's gender.

Insert Figures 2 and 3 About Here

Finally, the impact of *control* in family structure was dependent on a patient's age but not on a patient's gender. Increased control in family structure was associated with decreased severity of anticipatory nausea (slope = -.19) and increased dizziness (slope = .15) in younger patients, while it was associated with increased severity in anticipatory nausea (slope = .08) and decreased dizziness (slope = -.13) in older patients.

In summary, side effects of receiving chemotherapy were related to family environment and the degree to which each sub-domain of family environment influenced a patient's side effects depended on the patient's age and gender. Younger patients reported more severe and longer symptoms of post-treatment nausea, while older patients reported more problems with unsteady gait. Among sub-domains of family environment, conflict and organization showed consistent effects across several side effects as a function of age. For younger patients, an increase in family conflict was associated with increased side effects, including nausea and muscle twitching, while it was associated with a decrease in such side effects in older patients. For younger patients, a decrease in family organization was associated with increased side effects, including duration of post-treatment nausea and unsteadiness, while it was associated with a decrease in such side effects in older patients. It seems that the effects of sub-domains of family environment differ as a function of the patient's age more than the patient's gender. That is, an increase in family malfunctioning seems to have more adverse effects on younger rather than older patients' adjustment.

Discussion

The present study examined the effect of changes in family environment on the development of patient's side effects from receiving chemotherapy. The target effect was

also examined as a function of the patient's age and gender. The results showed that the relations between changes in family environment and the development of patient's side effects depended on the patient's age and gender. Specifically, an increase in family conflict produced adverse effects in younger patients, while it had apparently beneficial effects in older patients. The same trend was found with a decrease in family organization.

The results suggest that younger patients are more likely to develop side effects of chemotherapy when family members' open expression of anger, aggression, and disagreement increased and experienced organization and structure in planning activities and responsibilities became less clear. For younger patients, their own psychological resources may have not yet developed sufficiently to accommodate to unsupportive family dynamics during treatment. Their distress may be manifest as increased psychosomatic symptoms, such as more nausea and physical weakness. Older patients, on the other hand, who may have developed greater personal security within their family systems, may be able to withstand the potential adverse effect of family conflict and disorganization on their adjustment and, even further, may be able to utilize such occasions of open expression of other family members' distress to minimize their side effects. That is, older patients may use family conflict and disorganization as distracters to their bodily sensations and changes, or use them as outlets for distress of family members as well as themselves.

Although less consistently than age, gender also played a significant role in predicting the relation between family support and development of side effects. The results showed that unsupportive family environment had more adverse effect on female

patients' than male patients' adjustment. This finding is consistent with previous studies that demonstrated that women's adjustment was influenced by family or social support more than was men's (Ell et al., 1992; Reynolds & Kaplan, 1990).

Anxiety or distress has been related to hypervigilance regarding bodily sensations (Watson, Clark, & Harkness, 1994). Thus, unresolved malfunctioning in a family may increase a younger or female patient's distress, which, in turn, increase the likelihood of developing side effects. To better understand psychological mechanisms of nausea or physical weakness from receiving chemotherapy, some speculations about potential physiological mechanisms of physical weakness may be useful. For example, changes in skeletal muscle protein stores or metabolite concentrations, which might result from endogenous tumor necrosis factor (TNF) or from TNF administered as anti-neoplastic therapy, have been suggested as a mechanism for fatigue. In this model, the changes require patients to exert increased effort to generate adequate contractile force during exercise or extended periods of sitting or standing (St. Pierre et al., 1992). Lowered hemoglobin level has also been suggested as a reason for physical weakness in patients who are receiving cancer chemotherapy (Yellen et al., 1997).

These physiological changes may be influenced by a patient's perception about the family environment as related to the patient's age. For example, younger or female patients may experience more distress when they perceive their family environments unsupportive, which may impair their immune functioning (Affleck et al., 1997; Cohen & Herbert, 1996; Knapp et al., 1992; Walker et al., 1997), thus lessening physiological resiliency. These speculations need to be examined in future studies.

Although the findings in the present study need to be replicated in future studies, they suggest that cancer patients will benefit from intervention programs to help family members avoid conflict and maintain or improve family structure. Some types of interventions are especially likely to be effective. For example, cognitive-behavioral therapy is efficacious in resolving family conflict and enhancing family emotional support and problem-solving skills (Falloon, 1988; Varni & Corwin, 1993). General social support factors (e.g., social involvement, size of social network, closeness of relationships) appear to promote greater psychological well-being (Helgeson & Cohen, 1996) and better immune functioning (Cohen & Herbert, 1996) by changing family members' stress responses or by providing family members with stress buffering resources (see DeBoer, Ryckman, Pruyn, & Van den Borne, 1999, for review). Finally, the Multiple Family Discussion Group (MFDG: Ostroff & Steinglass, 1996), a program designed to encourage consideration of multiple perspectives, helps family members recognize and respect the needs of others within a system framework, identify competing demands, and alter circumstances to increase treatment implementation and effectiveness (Jacobs et al., 1998).

Limitations of this study should also be addressed. First, only the patients' perceptions of their family environment were assessed. Family dynamics are reciprocal between the patient and family members (Nicassio, Radojevic, Scholenfeld-Smith, & Dwyer, 1995), thus, both patient and family member perceptions about and adjustment to the situation need to be included in future studies. Second, the present study assessed the family as a group instead of specific individuals in the family. Certain individuals in a family may have more influence than others on a patient's adjustment to cancer. Unique

roles of individual family members in specific domains of patient coping need to be clarified to better understand how the family's dynamic processes affect patient adjustment. Third, the measure to assess side effects of receiving chemotherapy is a list of commonly cited side effects but not a standardized scale. Using a standardized measure will improve psychometric validity. Fourth, we did not have information about a patient's family environment before the diagnosis, which may serve as better baseline information. Finally, the absolute change in mean scores of the family environment subscales from the second to the fifth treatments were not clinically noticeable, although the residual changes (the score at the fifth treatment controlling for that at the second treatment) influenced on the patient's adjustment. Future studies designed to have a longer time gap between the two measurement points will lead a more precise understanding of the function of changes in family environment in the context of cancer diagnosis and treatment.

The findings of the present study suggest that the family influences a patient's adjustment to a medical situation and younger patients will benefit from intervention programs designed to help them avoid conflict among family members and improve family structure.

References

Affleck, G., Urrows, S., Tennen, H., Higgins, P., Pav, D., & Aloisi, R. (1997). A dual pathway model of daily stressor effects on rheumatoid arthritis. Annals of Behavioral Medicine, 19, 161-170.

Aiken, L. S., & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. New York: Sage Publications, Inc.

American Cancer Society. Cancer Facts and Figures – 2000. New York, NY: American Cancer Society, 2000.

Baider, L., Cooper, C. L., & De-Nour, A. K. (1995). Cancer and the family. New York, NY: John Wiley.

Bloom, J. R. (1982). Social support, accommodation to stress and adjustment to breast cancer. Social Science & Medicine, 16, 1329-1338.

Brophy, L. R., & Sharp, E. J. (1991). Physical symptoms of combination biotherapy: A quality-of-life issue. Oncology Nursing Forum, 18, 25-30.

Butow, P., Coates, A., Dunn, S., Bernhard, J., & Hurny, C. (1991). On the receiving end. IV: Validation of quality of life indicators. Annals of Oncology, 2, 597-603.

Carnrike, C. L. M., Brantley, P. J., Bruce, B., Faruqui, S., Gresham, F. M., Buss, R. R., & Cocke, T. B. (1988). Test-retest reliability and concurrent validity of the Morrow Assessment of Nausea and Emesis (MANE) for the assessment of cancer chemotherapy-related nausea and vomiting. Journal of Psychopathology and Behavioral Assessment, 10, 107-116.

Carter, R. E., & Carter, C. A. (1993). Individual and marital adjustment in spouse pairs subsequent to mastectomy. American Journal of Family Therapy, 21, 291-300.

Chang, V. T., Hwang, S. S., Feuerman, M., & Kasimis, B. S. (2000). Symptom and quality of life survey of medical oncology patients at a veterans affairs medical center: A role for symptom assessment. Cancer, 88, 1175-1183.

Cohen, J., & Cohen, P. (1983). Applied multiple regression/correlation analysis for the behavioral sciences. (2nd ed.), Hillsdale, NJ: Erlbaum.

Cohen, S., & Herbert, T. B. (1996). Health psychology: Psychological factors and physical disease from the perspective of human psychoneuroimmunology. Annual Review of Psychology, 47, 113-142.

De Boer, M. F., Ryckman, R. M., Pruyn, J. F. A., & van den Borne, H. W. (1999). Psychosocial correlates of cancer relapse and survival: A literature review. Patient Education & Counseling, 37, 215-230.

Dimeo, F., Stieglitz, R. D., Novelli-Fischer, U., Fetscher, S., Mertelsmann, R., & Keul, J. (1997). Correlation between physical performance and fatigue in cancer patients. Annals of Oncology, 8, 1251-1255.

Ell, K., Nishimoto, R., Mediansky, L., Mantell, J., & Hamovitch, M. (1992). Social relations, social support and survival among patients with cancer. Journal of Psychosomatic Research. 36, 531-541.

Falloon, I. R. H. (Ed.), (1988). Handbook of behavioral family therapy. New York, NY: Guilford.

Fobair, P. A., & Zabora, J. R. (1995). Family functioning as a resource variable in psychosocial cancer research: Issues and measures. Journal of Psychosocial Oncology, 13, 97-114.

Friedman, L. C., Baer, P. E., Nelson, D. V., Lane, M., Smith, F. E., & Dworkin, R. (1988). Women with breast cancer: Perception of family functioning and adjustment to illness. Psychosomatic Medicine, 50, 529-540.

Friedman, L. C., Lehane, D., Webb, J. A., Weinberg, A. D., & Cooper, H. P. (1994). Anxiety in medical situations and chemotherapy-related problems among cancer patients. Journal of Cancer Education, 9, 37-41.

Ganz, P. A., Schag, C. C., & Heinrich, R. L. (1985). The psychosocial impact of cancer on the elderly: a comparison with younger patients. Journal of the American Geriatrics Society, 33, 429-435.

Helgeson, V. S., & Cohen, S. (1996). Social support and adjustment to cancer: reconciling descriptive, correlational, and intervention research. Health Psychology, 15, 135-148.

Hickock, J. T., Roscoe, J. A., Morrow, G. R., Stern, R. M., Yang, B., Flynn, P. J., Hynes, H. E., Kirshner, J. J., & Rosenbluth, R. J. (1999). Use of 5-HT3 receptor antagonists to prevent nausea and emesis caused by chemotherapy for patients with breast carcinoma in community practice setting. Cancer, 86, 64-71.

Holahan, C. J., & Moos, R. H. (1986). Personality, coping, and family resources in stress resistance: A longitudinal analysis. Journal of Personality and Social Psychology, 51, 389-395.

Jacobs, J., Ostroff, J., & Steinglass, P. (1998). Family therapy: A systems approach to cancer care. In J. C. Holland (Ed.). Psycho-Oncology (pp. 994 – 1003). New York, NY: Oxford University Press.

Jamison, R. N., Burish, T. G., & Wallston, K. A. (1987). Psychogenic factors in predicting survival of breast cancer patients. Journal of Clinical Oncology, 5, 768-772.

Knapp, P. H., Levy, E. M., Giorgi, R. G., Black, P. H., Fox, B. H., & Heeren, T. C. (1992). Short-term immunological effects of induced emotion. Psychosomatic Medicine. 54, 133-148.

Koopman, C., Hermanson, K., Diamond, S., Angell, K., & Spiegel, D. (1998). Social support, life stress, pain and emotional adjustment to advanced breast cancer. Psycho-Oncology, 7, 101-111.

Lederberg, M. S. (1998). The family of the cancer patient. In J. C. Holland (Ed.). Psycho-Oncology (pp. 981 – 993). New York, NY: Oxford University Press.

Lynch, S. A. (1998). Who supports whom? How age and gender affect the perceived quality of support from family and friends. Gerontologist, 38, 231-238.

Mesters, I., van den Borne, H., McCormick, L., Pruyn, J., deBoer, M., & Imnos, T. (1997). Openness to discuss cancer in the Nuclear family: Scale, development, and validation. Psychosomatic Medicine, 59, 269-279.

Molassiotis, A., van den Akker, O. B., & Boughton, B. J. (1997). Perceived social support, family environment and psychosocial recovery in bone marrow transplant long-term survivors. Social Science & Medicine, 44, 317-325.

Moos, R. H., & Moos, B. S. (1986). Family Environment Scale Manual (2nd ed.), Palo Alto, CA: Consulting Psychologists Press, Inc.

Mor, V., Allen, S., & Malin, M. (1994). The psychosocial impact of cancer on older versus younger patients and their families. Cancer, 74(7 Suppl), 2118-2127.

Morrow, G. R. (1992). A patient report measure for the quantification of chemotherapy induced nausea and emesis: Psychometric properties of the Morrow Assessment of Nausea and Emesis (MANE). British Journal of Cancer - Supplement, 19, S72-74.

Morrow, G. R., & Roscoe, J. A. (1997). Anticipatory nausea and vomiting: models, mechanisms and management. In M. A. Dicoto (Ed.), Medical management of cancer treatment induced emesis (pp. 149-166). London: Martin Dunitz Ltd.

Morrow, G. R., Roscoe, J. A., & Hickok, J. T. (1998). Nausea and Vomiting. In J. C. Holland (Ed.), Psycho-oncology. (pp. 476-484). New York: Oxford University Press.

Morrow, G. R., Roscoe, J. A., Hickok, J. T., Stern, R. M., Pierce, H. I., King, D. B., Banerjee, T. K., & Weiden, P. (1998). Initial control of chemotherapy-induced nausea and vomiting in patient quality of life. Oncology, 12, S32-37.

Nail, L.M., Jones, L.S., Greene, D., Schipper, D.L., & Jensen, R. (1991). Use and perceived efficacy of self-care activities in patients receiving chemotherapy. Oncology Nursing Forum, 18, 883-887.

Nail, L.M., & Winningham, M.L. (1995). Fatigue and weakness in cancer patients: the symptoms experience. Seminars in Oncololgy Nursing, 11, 272-278.

Newell, S., Sanson-Fisher, R. W., Girgis, A., & Bonaventura, A. (1998). How well do medical oncologists' perceptions reflect their patients' reported physical and psychological problems? Data from a survey of five oncologists. Cancer, 83, 1640-1651.

Nicassio, P. M., Radojevic, V., Schoenfeld-Smith, K., & Dwyer, K. (1995). The contribution of family cohesion and the pain-coping process to depressive symptoms in fibromyalgia. Annuals of Behavioral Medicine, 17, 349-356.

Northhouse, L. L. (1995). The impact of cancer in women on the family. Cancer Practice, 3, 134-142.

Ostroff, J. S., & Steinglass, P. (1996). Psychosocial adaptation following treatment: A family systems perspective on childhood cancer survivorship. In L. Baider, C. L. Cooper, A. K. De-Nour (Eds.). Cancer and Family (pp. 129-147). New York, NY: John Wiley.

Peters-Golden, H. (1982). Breast cancer: Varied perceptions of social support in the illness experience. Social Science and Medicine, 16, 483-491.

Reynolds, P., & Kaplan, G. A. (1990). Social connections and risk for cancer: Prospective evidence from the Alameda County study. Behavioral Medicine, 16, 101-110.

Roscoe, J. A, Morrow, G. R., Hickock, J. T., & Stern, R. M. (2000). Nausea and vomiting remain a significant clinical problem: Trends over time in controlling chemotherapy-induced nausea and vomiting in 1413 patients treated in community clinical practices. Journal of Pain and Symptom Management, 20, 113-121.

Sanford, K., Bingham, C. R., Zucker, R. A. (1999). Validity issues with the Family Environment Scale: Psychometric resolution and research application with alcoholic families. Psychological Assessment, 11, 315-325.

Schag, C.A., & Heinrich, R.L. (1989). Anxiety in medical situations: Adult cancer patients. Journal of Clinical Psychology, 45, 20-27.

Sitzia, J., Hughes, J., & Sobrido, L. (1995). A study of patients' experiences of side-effects associated with chemotherapy: Pilot stage report. International Journal of Nursing Studies, 32, 580-600.

Spiegel, D., Bloom, J. R., & Gottheil, E. (1983). Family environment as a predictor of adjustment to metastatic breast carcinoma. Journal of Psychosocial Oncology, 1, 33-44.

Spiegel, D., & Kato, P. M. (1996). Psychosocial influences on cancer incidence and progression. Harvard Review of Psychiatry, 4, 10-26.

St. Pierre, B. A., Kasper, C. E., & Lindsey, A. M. (1992). Fatigue mechanisms in patients with cancer: Effects of tumor necrosis factor and exercise on skeletal muscle. Oncology Nursing Forum, 19, 419-425.

Steinglass, P. (1987). A systems view of family interaction and psychopathology. In T. Jacob (Ed.), Family interaction and psychopathology: Theories, methods, and findings (pp. 25-65). New York, NY: Plenum Press.

Varni, J. W., & Corwin, D. G. (1993). Growing up great. New York, NY: Berkley Books.

Walker, L. G., Walker, M. B., Heys, S. D., Lolley, J., Wesnes, K., & Eremin, O. (1997). The psychological and psychiatric effects of rIL-2 therapy: A controlled clinical trial. Psycho-Oncology, 6, 290-301.

Watson, D., & Clark, L. A., & Harkness, A. R. (1994). Structures of personality and their relevance to psychopathology. Journal of Abnormal Psychology, 103, 18-31.

Wellisch, D., Landsverk, J., Guidera, K., Pasnau, R. O., & Fawzy, F. (1983). Evaluation of psychosocial problems of the homebound cancer patient: I. Methodology and problem frequencies. Psychosomatic Medicine. 45, 11-21.

Williams, M. (1989). Family environment and general psychological distress level as possible predictors of anticipatory nausea and vomiting of cancer patients in chemotherapy treatment. Unpublished Dissertation. University of Temple.

Yellen, S. B., Cella, D. F., Webster, K., Blendowski, C., & Kaplan, E. (1997). Measuring fatigue and other anemia-related symptoms with the Functional Assessment of Cancer Therapy (FACT) measurement system. Journal of Pain and Symptom Management, 13, 63-74.

Author Note

Youngmee Kim and Gary Morrow, Behavioral Medicine, University of Rochester School of Medicine.

This research was supported by National Cancer Institute Grant CA37420.

We thank Drs Flynn at Metro-Minnesota CCOP, Hynes at Wichita CCOP, Kirshner at Syracuse Hematology-Oncology CCOP, and Pierce at Northwest CCOP for help with data collection. We also thank Drs. Jane Hickok and OJ Sahler for helpful comments on a draft of this article. We dedicate the current research to the memory of Heekyoung Kim.

Correspondence concerning this article should be addressed to Youngmee Kim, Behavioral Medicine, Mount Sinai School of Medicine, One Gustave L. Levy Place, Box 1130, New York, NY 10029-6574. Electronic mail may be sent to youngmee.kim@mssm.edu.

Table 1. Means and SD's of Study Variables

	Second Infusion		Fifth Infusion		
	Mean	SD	Mean	SD	$t_{(336)}$
Family Environment					
Cohesion	59.88	10.96	59.16	11.61	1.28
Expression	53.15	11.87	54.02	12.39	-1.47
Conflict	40.15	8.32	39.19	8.10	2.51*
Organization	55.63	12.29	56.12	12.41	-1.01
Control	47.95	9.90	47.24	9.65	1.38
Chemotherapy-Related Nausea					
Post-Treatment Severity	1.22	1.54	1.12	1.51	1.19
Post-Treatment Duration	12.33	25.10	13.67	28.14	-.92
Anticipatory Severity	.28	.85	.27	.78	.32
Anticipatory Duration	2.88	14.03	2.38	11.90	.50
Physical Symptoms					
Unsteady Gait	.78	1.01	.89	1.11	-1.89+
Dizziness	.96	1.09	1.12	1.15	-2.27*
Muscle Twitching	.35	.80	.46	.89	-2.21*
Vision Impaired or Blurred	.80	1.07	.81	1.06	-.21

+ $p < .10$ * $p < .05$

Table 2. Beta Coefficients from Hierarchical Regression on Side Effects at the Fifth Infusion

	PNS_5	PND_5	ANS_5	AND_5	Unsteadiness_5	Dizziness_5	Muscle_5	Vision_5
Step 1:								
DV_2	.52***	.52***	.18***	.01	.36***	.37***	.45***	.50***
Cohesion_2	.04	.07	.09	.05	-.08	-.01	.01	.02
Expression_2	.09+	.08	.05	.06	-.02	-.02	-.02	-.06
Conflict_2	.03	.10+	.12*	.04	.03	-.02	.03	-.04
Organization_2	-.01	-.05	-.08	-.03	.09	.01	.10+	.05
Control_2	.04	.06	.03	.07	-.04	.03	.00	.06
Step 2:								
Age	-.09+	-.11*	-.09	-.04	.22***	.08	.03	.00
Sex	.02	-.07	.09+	.12*	-.01	-.05	.03	-.03
Cohesion_5	.03	-.05	.18*	.07	-.10	.00	-.05	.00
Expression_5	.04	.10	-.03	.00	.04	.01	-.03	.04
Conflict_5	.06	.09	.07	.01	.02	.00	.10	.08
Organization_5	.03	.03	-.11	-.06	.01	.02	-.03	.13+
Control_5	-.05	-.06	.00	.05	-.02	.01	-.05	.05
Step 3:								
Age x Sex	.00	.02	.04	.08	.00	-.01	.03	-.01
Age x Cohesion_5	-.05	-.08	-.06	-.08	.01	.00	-.10	.03
Sex x Cohesion_5	.05	-.06	.09	.02	-.17*	.02	-.12+	.01
Age x Expression_5	.00	-.02	.07	.09	-.12*	-.06	-.01	-.02
Sex x Expression_5	.02	-.03	.01	.05	.04	-.03	.03	-.07
Age x Conflict_5	-.14*	-.12*	-.12+	-.02	.11+	.00	-.13*	.02
Sex x Conflict_5	-.06	.01	.10	.06	.04	-.03	-.08	.12+
Age x Organization_5	.03	.12*	.02	.00	.16*	.08	.00	.12+
Sex x Organization_5	-.02	.01	-.09	-.06	.12+	-.14*	-.03	.10
Age x Control_5	-.04	-.06	.11+	-.02	.01	-.12*	.09	-.04
Sex x Control_5	.04	-.03	-.02	.01	-.03	.09	.01	-.08

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

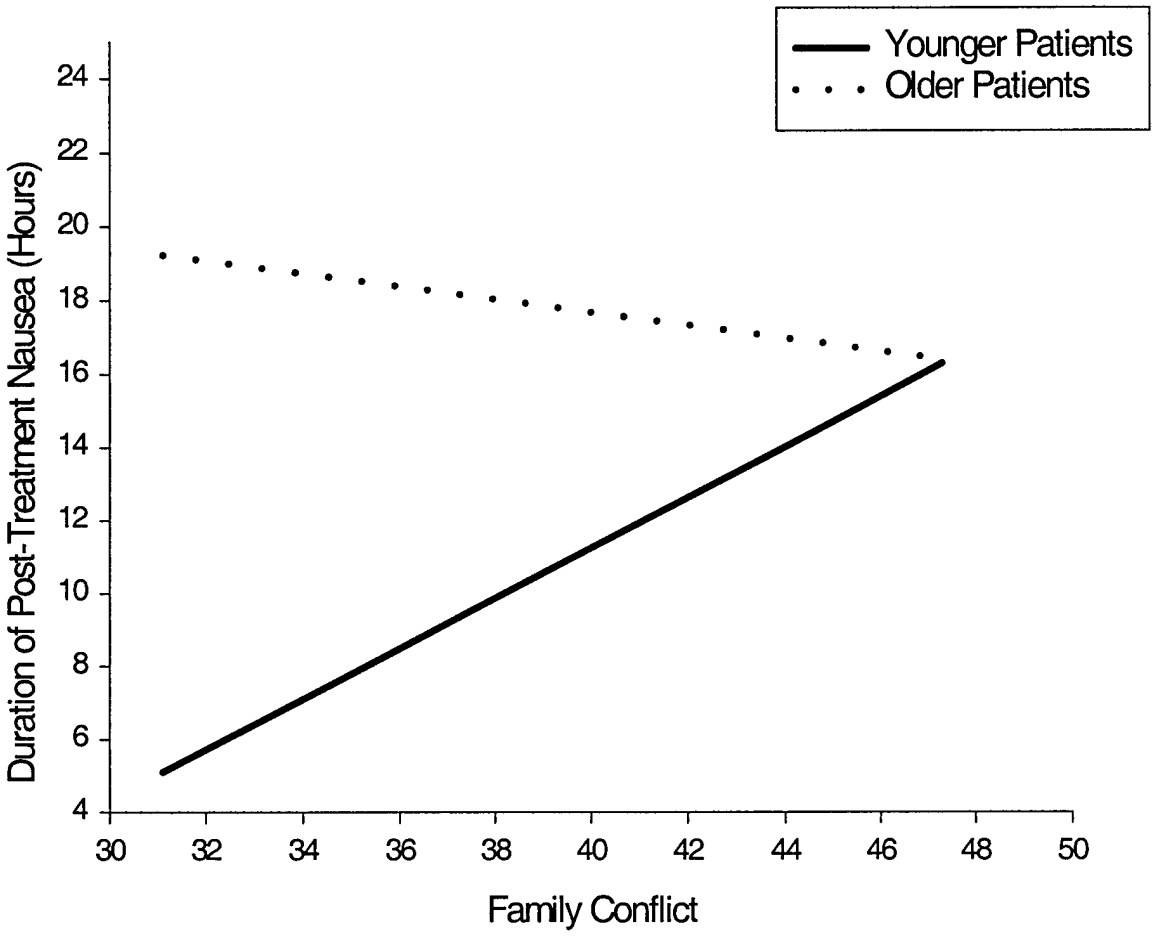
Note. _5 is a variable measured at the fifth infusion; _2 is a variable measured at the second infusion;
PNS = Post-Treatment Nausea Severity; PND = Post-Treatment Nausea Duration;
ANS = Anticipatory Nausea Severity; AND = Anticipatory Nausea Duration

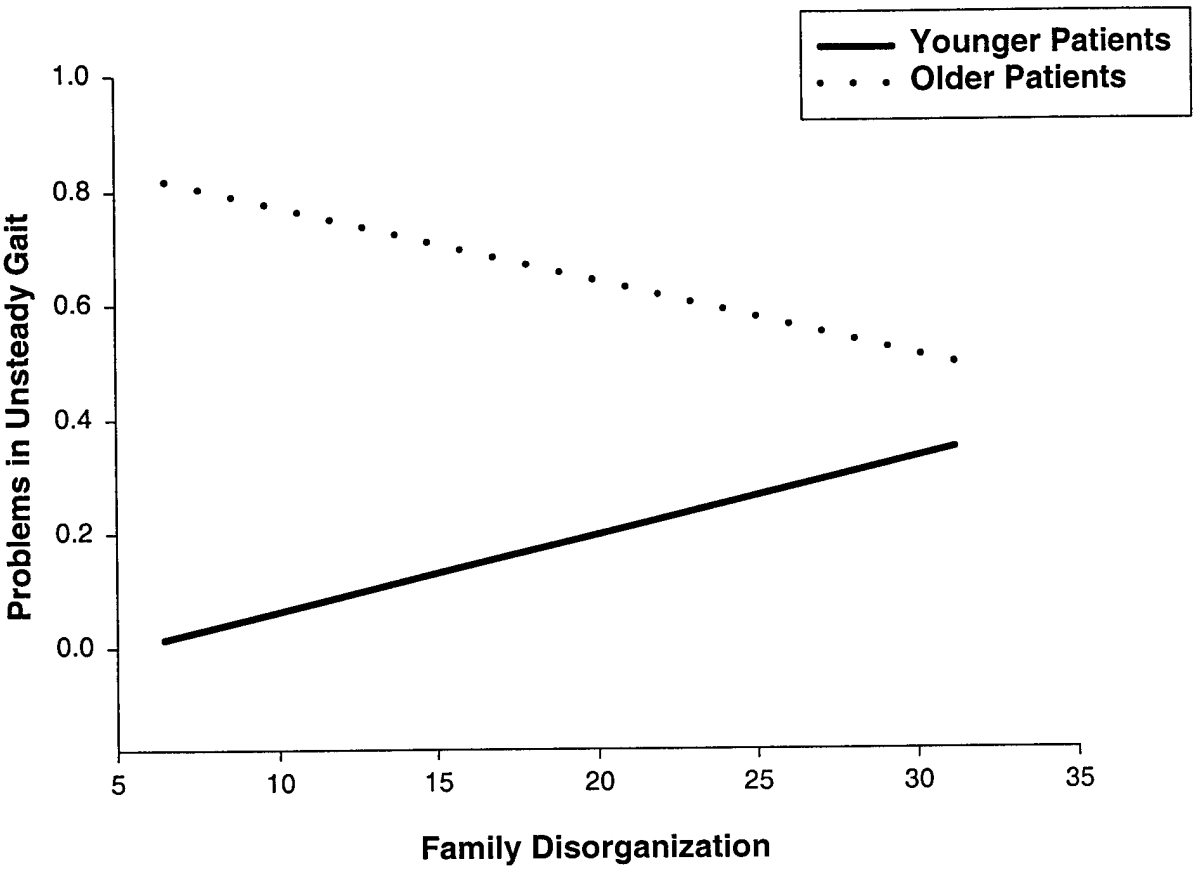
Figure Captions

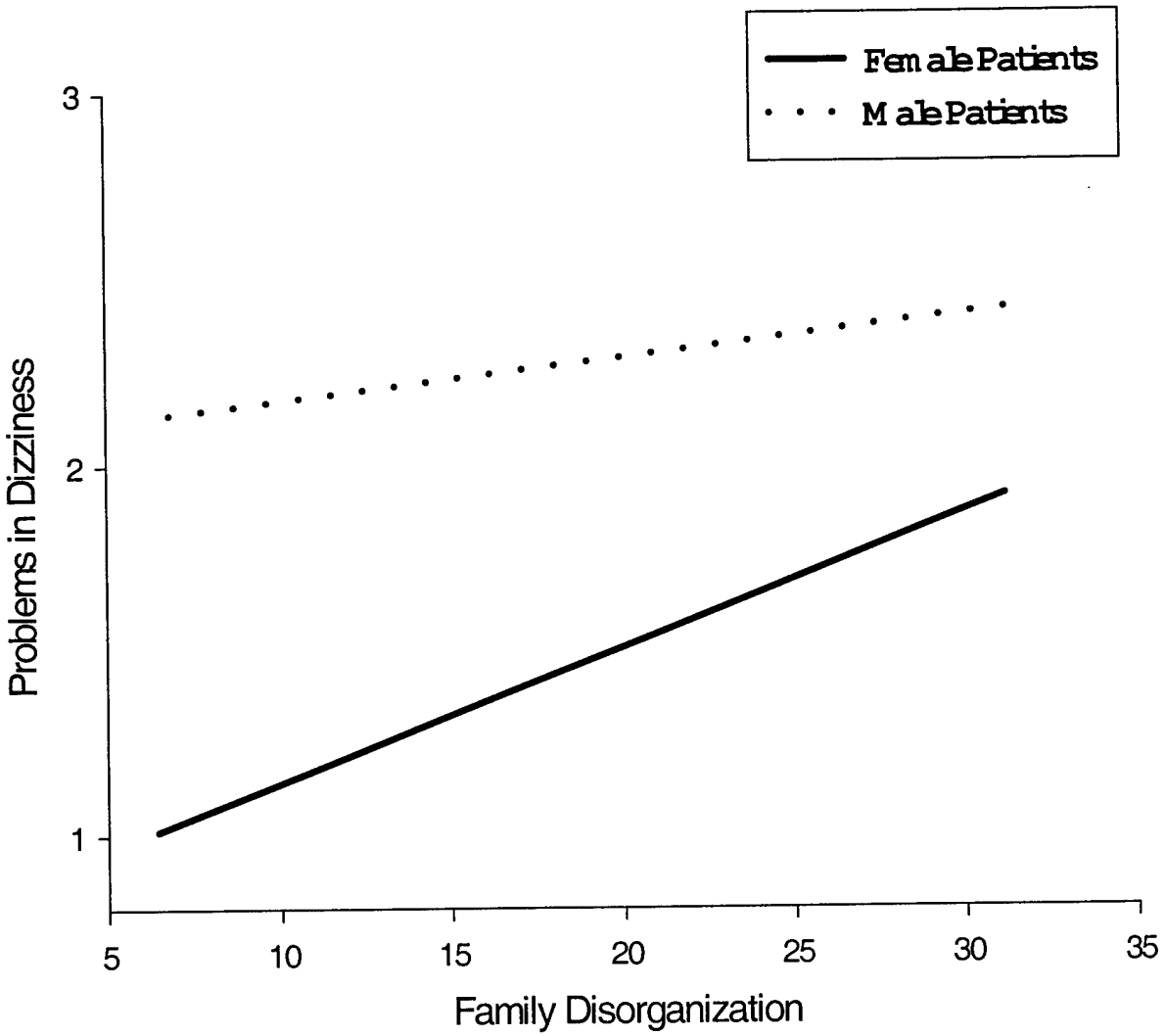
Figure 1. The effects of changes in family conflict on duration of post-treatment nausea as a function of a patient's age

Figure 2. The effects of changes in family organization on unsteadiness as a function of a patient's age

Figure 3. The effects of changes in family organization on dizziness as a function of a patient's gender


Younger Patients
Older Patients
Duration of Post-Treatment Nausea (Hours)
24
22
20
18
16
14
12
10
8
6
4
30
32
34
36
38
40
42
44
46
48
50
Family Conflict


Younger Patients
Older Patients
Problems in Unsteady Gait
1.0
0.8
0.6
0.4
0.2
0.0
5
10
15
20
25
30
35
Family Disorganization


Female Patients
Male Patients
Problems in Dizziness
3
2
1
5
10
15
20
25
30
35
Family Disorganization

Self-Concept, Aspirations, and Well-Being in South Korea and the United States

Youngmee Kim
University of Rochester

Tim Kasser
Knox College

Hoonkoo Lee
Yonsei University

Running Head: Self-concept and Aspirations

Correspondence to:
Youngmee Kim
Cancer Prevention and Control
Mount Sinai School of Medicine
One Gustave Levy Place, Box 1130
New York, NY 10029-6574
(212) 659-5646 (Office)
(212) 849-2564 (Fax)
youngmee.kim@mssm.edu

Abstract

This study examined the similarities and differences between three dimensions which represent people's focus on the self vs. the other: individualistic vs. collectivistic nations, independent vs. interdependent self-concepts, and intrinsic vs. extrinsic aspirations. In samples of South Korean and U. S. college students, we found that each of these dimensions inter-related in expected ways, and that each was also independently associated with different aspects of participants' self-report of their own well-being (i.e., self-actualization, vitality, happiness, anxiety, and physical symptoms). We conclude that environmental circumstances and personality characteristics which focus on personal needs are more likely to provide experiences supportive of psychological well-being.

Key words: individualistic vs. collectivistic cultures, independent vs. interdependent self-concepts, intrinsic vs. extrinsic aspirations, well-being, cross-cultural study

Self-Concept, Aspirations, and Well-Being in South Korea and the United States

Contemporary personality/social psychology contains several dimensional constructs representing the extent to which individuals focus on their own needs and rights versus their desires to fit their behavior and goals into the broader group. In this particular paper we focus on three such constructs, examining how they interrelate and how each is associated with personal well-being.

The first of the constructs, individualism vs. collectivism (Triandis, 1995), refers to a distinction between characteristics of the culture in which one lives. Individualistic nations, such as the economically developed, democratic Western nations, tend to suggest to their citizens that individual freedoms and rights are paramount. In contrast, collectivistic nations, such as the less economically developed Asian and Southern-hemispheric countries, send the message that social harmony and stability are most necessary for their citizens. The second, highly related construct, is independent vs. interdependent self-concept (Markus & Kitayama, 1991). This dimension refers not to a cultural context, but rather to a set of beliefs people have about themselves. Specifically, it refers to a dimension capturing the distinction between conceiving of one's self as an individual, autonomous being versus viewing one's self as highly embedded in others, roles, and statuses in society. People with independent self-concepts typically believe their own rights and feelings outweigh those of the group, while those with interdependent self-concepts are particularly focused on the stability and harmonious functioning of the whole group (Markus & Kitayama, 1991; Singelis, 1994). The third construct, intrinsic vs. extrinsic values (Kasser & Ryan, 1993, 1996), distinguishes

between strivings and aspirations likely to satisfy important psychological needs of the self (Ryan, 1995; Sheldon & Kasser, 1995, 1998) versus those more concerned with attaining social rewards and praise that signal high status within the group. Intrinsically oriented individuals are highly focused on goals for self-acceptance, affiliation, and community contribution, while extrinsically oriented individuals are more concerned with enhancing their wealth, image, or popularity.

As can be seen, in each of these three constructs, people can vary along a dimension where at one end they focus on their own individual psychological needs (individualistic cultures, independent self-concept, and intrinsic goals) while at the other end they are more concerned with making sure that their own behavior fits in with social norms (collectivistic cultures, interdependent self-concept, and extrinsic goals). On the face of it, the three conceptualizations have much in common, suggesting that they should be highly correlated with each other. Indeed, research and theory strongly suggest that living in an individualistic culture conduces towards an independent self-concept, while living in a collectivistic culture breeds interdependent self-concepts (Markus & Kitayama, 1991; Triandis, 1995). Further, some work shows differences between the types of values held by people with independent and interdependent self-concepts. For example, Oishi, Schimmack, Diener, and Suh (1998) examined the relations between independent and interdependent self-concepts and the values derived from Schwartz's (1994) theory of values in a sample of U.S. students. They found modest, but significant positive correlations between an independent self and measures of self-direction (which would be considered an intrinsic value), and positive correlations between an interdependent self and the values of benevolence (an intrinsic value), tradition, and

conformity (which are more similar to extrinsic values). While interesting, because this study was conducted in a highly individualistic nation, it is unclear how results might occur in other contexts, such as in a collectivistic nation.

One purpose of the present study was therefore to examine how the three dimensions (culture, self-concept, and values) were associated with each other, making sure to examine our hypotheses in both individualistic and collectivistic nations. We predicted that those subjects living in the U.S. would have a more independent self-concept, while subjects in South Korea would conceive of themselves more interdependently. We also explored the possibility that people's values would be differentially associated with their self-concepts. In particular, we expected to find that having an independent self-concept is associated with a stronger focus on intrinsic values, as both lead people to focus on their own inner needs. We expected a mixed pattern for the interdependent self-concept, however. That is, some of the intrinsic values, such as self-acceptance, appear somewhat at odds with this belief system, while others of the intrinsic values, such as community feeling and affiliation, may be more congruent with an interdependent self-concept.

The second, somewhat larger purpose of the present study was to examine how these three dimensions independently relate to personal well-being. Past research shows a clear pattern of results for two of the dimensions, but a more mixed pattern for the third. Regarding individualism/collectivism, for example, Diener, Diener, and Diener (1995) demonstrated in a large cross-cultural study that people living in individualistic nations are typically happier than those living in collectivistic cultures, and that this result held even after controlling for a number of other important national characteristics (e.g.,

wealth, basic need satisfaction, etc.). Regarding the intrinsic/extrinsic distinction, research has demonstrated that U.S. adults and late adolescents highly oriented toward intrinsic aspirations evidence greater self-actualization, vitality, openness to experience, and general functioning, and lesser distress (e.g., depression and anxiety) than those oriented toward extrinsic aspirations (Carver & Baird, 1998; Kasser & Ryan, 1993, 1996, in press; Sheldon & Kasser, 1995, 1998, 2000). Although these findings have been replicated in Germany (Schmuck, Kasser, & Ryan, 2000) and Russia (Ryan et al., 1999), this is the first study of which we are aware that has examined this phenomenon in an Asian culture.

While the well-being benefits of an individualistic nation and intrinsic values seem rather clear, work on the independent/interdependent self-concept is more mixed. Some research suggests that the independent self-concept is associated with lesser neuroticism than is the interdependent self-concept (Kwan, Bond, & Singelis, 1997). However, other studies suggest that individuals with interdependent self-concepts report more life satisfaction than those with independent self-concept within an individualistic culture (Bettencourt & Dorr, 1997) and that, in collectivistic cultures, characteristics of interdependent self-concepts, such as valuing relationship harmony and social norms, are equally strong predictors of individuals' life satisfaction as is independent self-concept (Kwan et al., 1997; Suh, Diener, Oishi, & Triandis, 1998).

To our knowledge, no study has investigated how well-being is simultaneously associated with each of these three dimensions representing a focus on personal needs vs. others' opinions. Despite the fact that the three dimensions are similar to each other, we saw good reason to suspect that each may play an important role in predicting well-being.

One reason for this is that each dimension refers to a different level of personal experience: Individualism/collectivism refers largely to an environmental context, independence/interdependence refers to a belief about one's self, and intrinsic/extrinsic refers to the values and goals one is striving towards in life. Because each of these levels of experience, though related, do not entirely overlap, each of the dimensions could bear some weight in explaining people's well-being. A second, more theoretical reason for this prediction is that the conceptualizations of the "self" from which each distinction derives are quite different. While the self of the individualism/collectivism and the independent/interdependent distinctions is primarily a "concept" inculcated from social experiences (Markus & Kitayama, 1991), the self of the intrinsic/extrinsic distinction is an experiencing center with inherent psychological needs which must be fulfilled in order for growth and optimal adjustment to occur (Ryan, 1995). Thus, the two distinctions may be tapping different parts of psychological functioning, one more "cognitive" and the other more "phenomenological" and motivational in nature.

In the current study we therefore expected to replicate past findings that living in an individualistic nation and placing a strong relative focus on intrinsic aspirations are associated with greater well-being, while living in a collectivistic nation and focusing on extrinsic aspirations are associated with lower well-being. We also suspected that an independent self-concept may yield more well-being benefits than would an interdependent self-concept, though recognize that the literature is mixed on this issue. Finally, we also examined whether people's home nation, self-concept, and aspirations, independently and/or interactively predict levels of personal well-being. Generally, we

expected each variable to typically account for its own share of variance in well-being, and that any interactions would merely be amplifications of the predicted main effects.

Methods

Participants and Procedures.

Participants included 542 students at U. S. (93 men and 122 women) and South Korean universities (149 men and 173 women) who completed a packet of questionnaires in small groups. Surveys were presented in subjects' native language, with South Korean scales translated by the first author, back-translated by a bilingual, then checked by the second author.

Measures.

Individualistic/Collectivistic Nation. We contrast-coded this variable so that Koreans received -1 and Americans received 1.

Independent and Interdependent Self-Concepts. The Independent and Interdependent Self-Construal Scale (Singelis, 1994) asks how much subjects agree or disagree with 24 statements on a 9-point Likert scale (1= strongly disagree, 9 = strongly agree). Average scores of 12 statements each for independent ($\alpha = .65$) and interdependent ($\alpha = .66$) self-concept were calculated. To represent the dimension of interest, the interdependent score was subtracted from the independent score to assess the relative independence/interdependence of subjects' self-concepts.

Intrinsic/Extrinsic Aspirations (Kasser & Ryan, 1993, 1996, in press). Subjects were presented with 57 "goals they may have for the future" and rated the importance of each goal on a 1 (not at all) to 9 (extremely) scale. In line with past work, aspirations for self-acceptance, affiliation, community feeling and physical fitness were considered

intrinsic while aspirations for financial success, social recognition, and attractiveness were considered extrinsic. Coefficients in the present study were .67 for intrinsic goals and .79 for extrinsic goals. Summary extrinsic scores were subtracted from summary intrinsic scores to compute a relative intrinsic/extrinsic orientation variable.

Well-being. Six variables assessed individuals' levels of well-being. On 9-point Likert scales, subjects completed the 15-item Jones and Crandall (1986) measure of self-actualization ($\alpha = .64$), the seven-item vitality measure (Ryan & Frederick, 1994, $\alpha = .86$), six items measuring anxiety (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974, $\alpha = .84$), and ten items reporting experience of physical complaints (Emmons, 1991; $\alpha = .79$). Finally, subjects reported the percentage of time they are generally happy and unhappy (Fordyce, 1988).

Results

Tests for Measurement Comparability and Sociocultural Differences on Constructs

First, we sought to demonstrate the reliability and comparability of study constructs across the two cultures by applying the multiple-group means comparison procedure (Little, 1997), in addition to the variance-covariance information of standard structural equation modeling analyses, using Amos 4.0 (Arbuckle & Wothke, 1999). Thus the following questions can be answered directly: (a) whether or not the same underlying dimension is measured with little or no bias across multiple groups (viz., measurement equivalence of the constructs) and (b) whether there are similarities and differences across groups on the error free means of the latent constructs (viz., construct comparability). The following three model fit indices were used in the present study: the root mean squared error of approximation (RMSEA), the normed fit index (NFI), and

comparative fit index (CFI). Values reflecting adequate fits of a specified model to the data were set at < .05 for the RMSEA measure (Browne & Cudeck, 1993) and > .9 for the NFI and CFI (Marsh, Balla, & McDonald, 1988). The self-concept construct was measured by two indicators: independent (reference) and interdependent self-concepts. The aspiration construct was measured by two indicators: intrinsic (reference) and extrinsic aspirations. Finally, well-being was measured by six indicators: self-actualization (reference), vitality, anxiety, physical symptoms, percentage of time happy, and percentage of time unhappy.

Showing good support for cultural comparability, the measurement model for each construct (self-concepts, aspirations, and well-being) without equal constraints fit satisfactorily (.00 < RMSEA's < .04; .99 < NFI's < 1.00; .99 < CFI's < 1.00). When both factor loadings and intercepts in measurement models were constrained to be equal between two nations, each construct was again found to be comparable (.03 < RMSEA's < .12; .95 < NFI's < 1.00; .96 < CFI's < 1.00). Thus, we can be confident that our primary study variables were both reliably and equivalently measured across cultures.

Because construct comparability was tenable, equality of the latent means was tested between the two nations (Little, 1997). All corresponding parameters (viz., factor loadings, intercepts, and error variances of observed variables) were freed for the Korean sample and set to be the same for the U.S. sample. The estimated latent factor means were fixed to 0 for the Korean sample and freed for the U.S. sample, thus a given construct's mean could be identified and estimated as a relative difference from the reference point estimated in the Korean sample (Joreskog & Sorbom, 1996; McArdle & McDonald, 1984).

The results showed that the fit of the model was satisfactory but significantly different from the model without equal constraint in latent means: for self-concept, χ_{diff}^2 (11) = 96.10, $p < .001$; for aspirations, χ_{diff}^2 (15) = 99.64, $p < .001$; and for well-being, χ_{diff}^2 (11) = 52.91, $p < .001$. What this means is that the results indicated that two cultures did differ in their endorsement of the personality variables. In line with past research, the U.S. sample was higher than the Korean sample in independent self-concept and in well-being; the U.S. sample was also higher in intrinsic aspirations. Using the Korean sample as a reference group of mean equal zero, differences in construct means were .85, .31, and .48, $ps < .001$, for self-concept, aspirations, and well-being, respectively.

Independent/Interdependent Self-Concepts and Intrinsic/Extrinsic Aspirations

Next, we examined relationships between self-concepts and aspirations, to determine whether our results conceptually replicated Oishi et al. (1998) when tested in both individualistic and collectivistic cultures. Supporting their results and our hypothesis, having an independent self-concept was positively associated with students' focus on intrinsic aspirations ($r = .16$ in Korea; $r = .17$ in U.S., $ps < .05$) and negatively correlated with their focus on extrinsic aspirations ($r = -.11$ in Korea; $r = -.14$ in U.S., $ps < .05$). As expected, the directions of relationship between interdependent self-concept and intrinsic versus extrinsic aspirations were more mixed, however. Although the interdependent self-concept was negatively associated with the summary intrinsic score ($r = -.12$ in Korea, $p < .05$; $r = -.08$ in U.S., ns), the pattern of correlations with individual intrinsic subscales showed that an interdependent self-concept was associated with greater community feeling ($r = .11$ in Korea, $p < .05$; $r = .12$ in U. S., $p < .10$) and less

focus on self-acceptance (r = -.24 in Korea; r = -.19 in U. S., ps < .01). Similarly, an interdependent self-concept showed no association with the summary extrinsic score (r = .05, in Korea; r = .01 in U. S., ns), but was associated with a greater focus on social recognition (r = .16 in Korea; r = .20 in U. S., ps < .01) and less focus on financial success (r = -.10 in Korea, p < .10; r = -.14 in U. S., p < .05). These associations were not different between the two nations.

Predicting Well-Being

We then examined how the three dimensions of interest predicted subjects' well-being. The top triple of Table 1 presents beta weights resulting from simultaneous regression analyses for the combined U.S. and South Korean sample, in which each of the six well-being indicators was regressed onto the contrast-coded nation variable, the relative independent to interdependent self-concept variable, and the relative intrinsic to extrinsic aspiration variable. As can be seen, U.S. students reported greater self-actualization, vitality, and happiness than did Korean students. Further, the relative independent to interdependent self-concept variable was associated with greater self-actualization, vitality, and happiness, and with less unhappiness and anxiety. Finally, the relative intrinsic to extrinsic aspiration measure was associated with greater self-actualization, and with less anxiety and physical symptoms.

Insert Table 1 About Here

To examine whether the predictors of well-being differed by individuals' national context, we re-conducted these regression analyses separately in the two countries.

Results are reported in the middle and bottom triples of Table 1. Within samples from both countries, a relative independent self-concept was associated with greater self-actualization, vitality, and happiness; however, only in Korea did the relative independent self-concept predict less unhappiness and only in the U.S. did the relative independent self-concept predict low anxiety. Results across the two cultures were almost identical for the relationships between well-being and the relative intrinsic/extrinsic aspiration measure, such that a strong focus on intrinsic relative to extrinsic aspirations was associated with greater well-being. Thus, regardless of whether they live in an individualistic or a collectivistic nation, the current results suggest that people's well-being benefits from the belief that they are autonomous beings and from a focus on goals likely to satisfy one's needs.

Finally, we examined potential two-way interactions between aspirations and self-concept, and three-way interactions with the additional variable of nation, in the prediction of well-being, using a hierarchical regression format. Only one significant two-way interaction was detected: the negative associations between extrinsic aspirations and greater anxiety were amplified for individuals relatively high in interdependent self-concept ($\beta = -.13$, $p < .02$). In addition, only one significant three-way interaction occurred. For the Korean students, intrinsic aspirations were especially associated with greater self-actualization when individuals were high in independent self-concept. For the U. S. students, intrinsic aspirations were especially associated with greater self-actualization when the individual had a relatively high interdependent self-concept ($\beta = -.13$, $p < .02$). Interpretation of these two interactions should be treated cautiously, as they are quite possibly due to chance given the large number of analyses conducted.

Discussion

The present study expands on previous research by examining several hypotheses associated with national context, individual self-concept, personal goals, and subjective well-being. First, we examined how self-concept and values relate to each other within both an individualistic and a collectivistic nation. Within both South Korean and U.S. students, the pattern of results was essentially the same, and were parallel to previous results reported by Oishi et al. (1998). As expected, people with an independent self-concept were more likely to place a strong value on intrinsically oriented goals and less likely to be focused on extrinsically oriented goals. This is to be expected, given that an independent self-concept, with its concern for autonomous regulation, might orient people towards goals congruent with their own psychological needs and away from goals focused on status and others' opinions. Results for the interdependent self-concept were rather more complex, as correlations indicated more self-concept/value relational specificity. With regards to intrinsic values, interdependent people were more likely to value community feeling and less concerned with self-acceptance; for extrinsic values, interdependent people were more concerned with social recognition and less focused on financial success. Again, these results are in line with those of Oishi et al. (1998) and show that one's self-concept bears important relationships with the content of one's values and goals.

We also extended previous research by simultaneously examining how cultural context, self-concept, and values independently relate to personal well-being. The results supported our hypotheses that living in an individualistic nation, believing that one is an autonomous, independent individual, and striving for intrinsic aspirations associated with

psychological needs are associated with greater well-being. In contrast, results suggested that living in a collectivistic nation, conceiving of oneself as highly embedded in social roles and statuses, and pursuing aspirations designed to obtain rewards and praise are associated with lower well-being. As expected, these results were essentially parallel in two samples of college students, one from the highly individualistic nation of the United States, the other from the more collectivistic culture of South Korea. Further, the results are consistent with past work demonstrating beneficial relationships between well-being and individualistic nations (Diener et al, 1995), independent self-concepts (Oishi, Diener, Lucas, & Suh, 1999), and intrinsic aspirations (Kasser & Ryan, 1996), but are inconsistent with some past work demonstrating that interdependent self-concepts relate positively to well-being and life satisfaction in collectivistic nations (Kwan et al., 1997; Suh et al., 1998). Thus, our research adds to the growing, but somewhat contradictory, literature associating an independent self-concept with well-being, and confirms previous work on the well-being benefits of living in an individualistic culture and pursuing intrinsic rather than extrinsic goals.

Why should this conglomeration of environmental circumstances, beliefs about the self, and values and goals lead people to experience greater well-being and less distress? Our sense is that the best answer derives from the concept of needs. Needs are "psychological nutriments" (Ryan, 1995) which must be satisfied in order that individuals can grow, thrive, and feel good about themselves (Sheldon, Ryan, & Reis, 1996; see also Maslow, 1954). Living in an individualistic culture provides an environment which encourages people to focus on their own needs and determine means of satisfying them (Triandis, 1995); having an independent self-concept leads people to believe that their

own needs are of large importance, and thus to set up their identity around them (Markus & Kitayama, 1991); and pursuing intrinsic aspirations leads people to be more likely to have experiences which might satisfy their needs (Kasser, in press). In sum, people are more likely to be able to satisfy their psychological needs in such contexts and with such beliefs and goals.

In contrast, collectivistic nations, interdependent self-concepts, and extrinsic values are highly focused on the "other" and on making sure that one's behaviors, expressions, and desires fit into what is acceptable to the whole group. Such an external focus may lead people to attend less to their psychological needs, and to thus have frequent experiences of contingent evaluation in which they feel their worth is on the line, experiences which are rarely pleasant (see Deci & Ryan, 1991; Rogers, 1961). In other words, such environments, self-concepts, and goals, are relatively lacking in experiences of psychological nutriments, causing potentially less need-satisfaction, and thus lowered well-being.

These conclusions must of course be tempered by several limitations to the current study. First, our use of college students as participants calls into question the generalizability of our sample; this might be especially worrisome in the case of the South Korean sample, in which college students are probably more independent in their self-concept than, for example, rural farmers. Second, all data are self-report, leaving open the possibility that response biases or shared method variance may be primarily responsible for the results. Third, all data are cross-sectional and correlational, thus making the results causally ambiguous. That is, it is unclear whether self-concepts and goals lead to well-being, happier people form independent self-concepts and pursue

intrinsic goals, or whether some third variable may be operating which explains the relationships. Fourth, the amount of variance accounted for in regression equations was by no means large, suggesting that a variety of other factors need to be assessed in order to provide a fuller understanding of well-being. Fifth, it would have been more desirable to directly measure participants' levels of individualism/collectivism rather than use a dummy code for nation, as individuals certainly experience and internalize this environmental dimension differently within the same nation, and as there are many differences between the nations we sampled besides their standing on this variable.

A final limitation concerns our use of well-being as the primary outcome variable of this study. Such a strategy runs the risk of leading people to conclude that individualistic nations, independent self-concepts, and intrinsic aspirations are "better" than collectivistic nations, interdependent self-concepts, and extrinsic aspirations. The idea that "happiness" is the most important aim for humans is itself a value judgment, one especially consistent with individualism, independence, and intrinsic values. The aims better supported by collectivistic nations and interdependent self-concepts, such as relationship harmony and social stability, or represented in extrinsic aspirations, such as economic progress, can certainly be conceived of as equally or more "valuable" than personal happiness and well-being. Further, we remind the reader that all is not rosy for independent self-concepts and living in an individualistic nation, which are associated with higher suicide and divorce rates and substantial ecological degradation (Triandis, 1995). Future studies are thus called for to examine a broader range of variables which will help researchers better understand and untangle these complex issues.

References

Arbuckle, J. L., & Wothke, W. (1999). Amos 4.0 User's Guide. Chicago: Small Waters Corporation.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), Testing structural equation models (pp. 136-162). Newbury Park, CA: Sage.

Bettencourt, B. A., & Dorr, N. (1997). Collective self-esteem as a mediator of the relationship between allocentrism and subjective well-being. Personality and Social Psychology Bulletin, 23, 955-964.

Carver, C. S., Baird, E. (1998). The American dream revisited: Is it what you want or why you want it that matters? Psychological Science, 9, 289-292.

Deci, E. L, & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), Nebraska symposium on motivation: Vol. 38, (pp. 237-288). Lincoln: University of Nebraska Press.

Derogatis, L. R., Lipman, R. S., Rickels, K., Uhlenhuth, E. H., & Covi, L. (1974). The Hopkins Symptom Checklist (HSCL): A self-report symptom inventory. Behavioral Science, 19, 1-15.

Diener, E., Diener, M., & Diener, C. (1995). Factors predicting the subjective well-being of nations. Journal of Personality and Social Psychology, 69, 851-864.

Emmons, R. A. (1991). Personal strivings, daily life events, and psychological and physical well-being, Journal of Personality, 59, 453-472.

Fordyce, M. W. (1988). A review of research on the happiness measures: A sixty second index of happiness and mental health. Social Indicators Research, 20, 355-382.

Jones, A., & Crandall, R. (1986). Validation of a short index of self-actualization. Personality and Social Psychology Bulletin, 12, 63-73.

Joreskog, K. G., & Sorbom, D. (1996). LISREL 8: User's reference guide. Scientific Software International.

Kasser, T. (in press). Sketches for a self-determination theory of values. In E. L. Deci and R. M. Ryan (Eds.) Handbook in self-determination research. Rochester, NY: University of Rochester Press.

Kasser, T., & Ryan, R. M. (1993). A dark side of American dream: Correlates of financial success as a central life aspiration. Journal of Personality and Social Psychology, 65, 410-422.

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Well-being correlates of intrinsic and extrinsic goals. Personality and Social Psychology Bulletin, 22, 281-288.

Kasser, T., & Ryan, R. M. (in press). Be careful what you wish for: Optimal functioning and the relative attainment of intrinsic and extrinsic goals. In P. Schmuck & K. M. Sheldon (Eds.) Life goals and well-being. Goettingen, Germany: Hogrefe.

Little, T. D. (1997). Mean and covariance structures (MACS) analyses of cross-cultural data: Practical and theoretical issues. Multivariate Behavioral Research, 32, 53-76.

Kwan, V. S. Y., Bond, M. H., & Singelis, T. M. (1997). Pancultural explanations for life satisfaction: Adding relationship harmony to self-esteem. Journal of Personality and Social Psychology, 73, 1038-1051.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. Psychological Review, 98, 224-253.

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. Psychological Bulletin, 103, 391-410.

Maslow, A. H. (1954). Motivation and personality. NY: Harpers.

McArdle, J. J., & McDonald, R. P. (1984). Some algebraic properties of the Reticular Action Model for moment structures. British Journal of Mathematical & Statistical Psychology, 37, 234-251.

Oishi, S., Schimmack, U., Diener, E., & Suh, E. M. (1998). The measurement of values and individualism-collectivism. Personality & Social Psychology Bulletin, 24, 1177-1189.

Oishi, S., Diener, E., Lucas, R. E., & Suh, E. M. (1998). Cross-cultural variations in predictors of life satisfaction: Perspectives from needs and values. Personality & Social Psychology Bulletin, 25, 980-990.

Rogers, C. R. (1961). The process equation of psychotherapy. American Journal of Psychotherapy. 15, 27-45.

Ryan, R. M. (1995). Psychological needs and the facilitation of integrative processes. Journal of Personality, 63, 397-427.

Ryan, R. M., Chirkov, V. I., Little, T. D., Sheldon, K. M., Timoshina, E., & Deci, E. L. (1999). The American dream in Russia: Extrinsic aspirations and well-being in two cultures. Personality & Social Psychology Bulletin, 25,1509-1524.

Ryan, R. M., Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. Journal of Personality, 65, 529-565.

Schmuck, Kasser, T., & Ryan, R. M. (2000). Intrinsic and extrinsic goals: Their structure and relationship to well-being in German and U. S. college students. Social Indicators Research, 50, 225-241.

Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. Journal of Personality and Social Psychology, 68, 531-543.

Sheldon, K. M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress, but not all progress is beneficial. Personality and Social Psychology Bulletin, 24, 1319-1331.

Sheldon, K. M., & Kasser, T. (2000). Getting older, getting better: Personal strivings and psychological maturity across the life span. Manuscript under review.

Sheldon, K. M., Ryan, R. M., & Reis, H. T. (1996). What makes for a good day? Competence and autonomy in the day and in the person. Personality & Social Psychology Bulletin, 22, 1270-1279.

Singelis, T. M. (1994). The measurement of independent and interdependent self-construals. Personality and Social Psychology Bulletin, 20, 580-591.

Suh, E., Diener, E., Oishi, S., & Triandis, H. C. (1998). The shifting basis of life satisfaction judgments across cultures: Emotions versus norms. Journal of Personality and Social Psychology, 74, 482-493.

Triandis, H. C. (1995). Individualism and collectivism. Boulder, CO: Westview Press.

Author Note

Youngmee Kim, Department of Psychology, University of Rochester; Tim Kasser, Department of Psychology, Knox College; and Hoonkoo Lee, Department of Psychology, Yonsei University.

Correspondence concerning this article should be addressed to Youngmee Kim, Behavioral Medicine, University of Rochester School of Medicine, 601 Elmwood Ave., Box 704, Rochester, NY 14642, youngmee_kim@urmc.rochester.edu, or to Tim Kasser, Box 83, Knox College, Galesburg, IL 61401, tkasser@knox.edu.

Table 1. Beta Regression Coefficients of Well-being Measures

	Self-Actualization	Vitality	Happiness	Unhappiness	Anxiety	Physical Symptoms
Whole Sample						
R-Independent	.24***	.17***	.18***	-.13**	-.11*	-.02
R-Intrinsic	.32***	.05	-.03	-.04	-.12**	-.17***
Nation (Korea= -1; U.S.=1)	.34***	.23***	.21***	-.02	-.06	-.01
R-square	.36***	.10***	.08***	.02	.04***	.03***
Korean Sample						
R-Independent	.27***	.16**	.19***	-.15**	-.04	.04
R-Intrinsic	.36***	.03	-.06	.01	-.11+	-.18**
R-square	.24***	.03*	.04**	.03*	.02	.03*
U. S. Sample						
R-Independent	.25***	.20**	.17*	-.10	-.22***	-.12+
R-Intrinsic	.33***	.07	.00	-.11	-.12+	-.15*
R-square	.22***	.05*	.04*	.03	.07***	.04*

Note. + = p < .10, * = p < .05, ** = p < .01, *** = p < .001.

R-Independent = Relative independent to interdependent self-concept;

R-Intrinsic = Relative intrinsic to extrinsic aspirations

The Self-Regulation of Withholding Negative Emotions: Development of a Questionnaire

Youngmee Kim, Edward L. Deci, and Miron Zuckerman

University of Rochester

Running Head: Self-Regulation of Withholding Negative Emotions

Correspondence to:

Youngmee Kim

Cancer Prevention and Control

Mount Sinai School of Medicine

One Gustave Levy Place, Box 1130

New York, NY 10029-6574

(212) 659-5646

(212) 849-2564 (Fax)

youngmee.kim@mssm.edu

Abstract

Based on the Self-Determination Theory, a questionnaire was developed to measure individual differences in the Self-Regulation of Withholding Negative Emotions (SRWNE). Reliability and validity concerning the scale were examined in three studies. Results in Study 1 demonstrated the distinctiveness of the SRWNE from emotional regulation measures, suggesting that the SRWNE may be appropriate to measure styles of self-regulation and to clarify the negative affect-health relation. In Study 2, test-retest reliability of scores on the SRWNE subscales was examined as was validity of the SRWNE with respect to coping strategies and health. The SRWNE was related to self-reports of health and may be relevant for predicting how people cope with stress. Study 3, compared a Korean sample with the U. S. sample in Study 2, demonstrating construct comparability of the SRWNE across cultures and genders.

Key words: self-regulation; withholding negative emotions; scale development

The Self-Regulation of Withholding Negative Emotions: Development of a Questionnaire

The relation between expression of affect and symptoms of illness has been documented in many studies (for reviews, see Friedman & Booth-Kewley, 1987; Watson & Pennebaker, 1989). A prominent hypothesis has been that emotional expression has beneficial effects on health (e.g., Beutler, Engle, Oro-Beutler, Daldrup, & Meredith, 1986; Udelman & Udelman, 1981), so, individual differences in the extent to which people withhold expression of emotion and the relation of withholding to health outcomes have been extensively examined.

Bonanno, Davis, Singer, and Schwartz (1991) and Weinberger (1990) identified a repressive personality style, characterized by avoidance of potentially threatening social encounters or associative thoughts that might lead to conscious conflict or embarrassing experiences. Repressors were more likely to develop cancer (Cox & McCay, 1982) and showed a shorter period of being recurrence-free (Jensen, 1987) when compared to non-repressors. Indeed, a relation has been found between the tendency to repress and deny negative emotions and the likelihood of developing asthma, cancer, and suppressed immune functioning (Schwartz, 1990) and of having lower survival rates following diagnosis (Dattore, Shontz, & Coyne, 1980). Emotional inhibition has also been associated with negative health consequences (Pennebaker, 1995), such as arthritis (Udelman & Udelman, 1981), coronary heart disease (Goldstein, Edleberg, Meier, & Davis, 1988), and symptom reports (Kohn, Lafreniere, & Gurevich, 1991).

However, the hypothesis that emotional expression is beneficial to health and emotional withholding has a negative effect on health has been challenged by more complex findings. For instance, facial emotional expression has been found to attenuate arousal (Buck, 1984) as well as

augment arousal (Lanzetta, Cartwright-Smith, & Eleck, 1976). Cardiovascular disease has been related to emotional expression (Hecker, Chesney, Black, & Frautschi, 1988) as well as to inhibition of emotional expression (Haynes, Feinleib, & Kannel, 1980; King & Emmons, 1990; MacDougall, Dembroski, Dimsdale, & Hackett, 1985). Thus, these findings have made the association between withholding emotions and health problems somewhat equivocal.

Processes other than emotional expression *per se* have been considered as predictors of physical symptoms. For instance, the effects of autonomic arousal as physical symptoms varied as a function of both situational factors and individual differences in styles of emotional expression (Roth & Cohen, 1986). When emotional expression was an important personal goal and conflicted with social norms or other personal goals, individuals were more likely to experience psychosomatic symptoms (King & Emmons, 1991; Pennebaker & Lightner, 1988).

Similarly, research showed that various individual differences in regulating emotional expression was associated with psychological and physiological responses. For example, in the traditionally male-oriented medical training environment, high interpersonal dependency manifested by men and high non-affectivity manifested by women were correlated with depressive symptoms and alcohol-related problems (Richman, 1988). When participants were asked to respond to an annoying confederate in a manner consistent with their usual style of anger expression (viz., an "anger-in" style or an "anger-out" style), they showed more rapid recovery from elevations in cardiovascular parameters than when they were asked to respond to the annoying confederate in a manner different from their own style (Engebretson, Matthews, & Sheer, 1989).

Such results suggest the necessity of considering additional individual differences as well as situational factors in the regulation of emotional expression. Thus, King and Emmons' (1990) proposed that ambivalence about not expressing emotion, rather than inexpressiveness *per se,* is

what fosters ill-being. Findings concerning ambivalence about emotional expression showed that ambivalence was positively associated with self-reported physical symptoms, the number of visits to health-care providers, and depression (Katz & Campbell, 1994; King & Emmons, 1990). However, a potential inadequacy in the work on ambivalence about emotional expression is that King and Emmons did not specify plausible reasons for why individuals would be ambivalent nor what factors would influence ambivalence.

It appears that individual differences in emotional regulation, including the tendency to express negative emotions and ambivalence about expressing negative emotions, may influence health, although the process underlying the relations remains unclear. To help clarify the processes, self-determination theory (SDT) was employed for developing a scale to measure individual differences in emotional regulation.

Internalization of Emotional Regulation

SDT (Deci & Ryan, 1985a) distinguishes between two classes of intentional behavior -- autonomous and controlled. Autonomous behavior is regulated through the process of choice and has an internal perceived locus of causality (deCharms, 1968). Controlled behavior is pressured or coerced by interpersonal or intrapsychic forces and has an external perceived locus of causality.

Internalization concerns the process of taking in an external regulation or value. SDT distinguishes between types of internalization, which can be thought of in terms of how completely people accept the regulation as their own. The different types of internalization result in different types of regulation that can be ordered along the controlled-to-autonomous continuum (Ryan & Connell, 1989). When no internalization has occurred, a behavior is externally regulated which is the most heteronomous form of regulation. Even though the external regulation of emotional expression is intentional, it is controlled by external forces, such as reward contingencies.

One type of internalization is referred to as introjection. It represents only a partial internalization and results in introjected regulation. This type of regulation, in which people pressure and coerce themselves to behave in particular ways, involves the implicit expectation of self-approval for compliance and self-derogation for noncompliance. Introjected regulation, although within people, is phenomenally still closely anchored to external forces and is often prompted by the desire to avoid guilt or shame. It amounts to self-control –to coercing or controlling oneself. When people withhold expression of negative emotion because they think they should and would feel ashamed if they did not, the regulation is introjected. Both external and introjected forms of regulation are considered relatively controlled, and thus low in autonomy.

When people identify with a regulation and its value, the resulting regulation is called identified regulation. As members of a group or society, people may volitionally self-regulate in ways that are valued or sanctioned by that collective. For example, they may freely withhold a negative emotion because they personally value not disrupting a group process.

Finally, when internalization is complete, people will have integrated that identification with other aspects of their self and will be truly autonomous in the subsequent behavior. The resulting integrated regulation of emotions involves being aware of one's emotions and regulating their expression with a full sense of choice. The goal of emotional integration is not to have a person comply with social norms by suppressing strong inner urges; rather, it is to have the individual assimilate emotions and utilize inner experiences flexibly in acting autonomously. When an emotional regulation has been integrated, individuals will experience little inner conflict about it and, thus, may evidence better health. Both identified and integrated regulations are considered relatively autonomous forms of internalized regulation.

The regulation for withholding expression of negative affect is broadly defined as the way in which individuals manage the experience and withholding of negative emotions and impulses. For example, when an event stimulates a negative emotion such as anger or fear, people might either express or not express that feeling through words or actions. According to SDT, having healthy outcomes associated with the inexpression of negative emotions requires the full internalization of the regulation of the relevant emotional withholding so that the regulatory processes are integrated with the individual's self. The withholding would be autonomous and people would choose to withhold because it feels personally right not to express the emotions in that situation. In contrast, when controlled, people would suppress the feelings because they believe it is bad to have such feelings and/or to let others know they have them. They would thus experience conflict and tension, so less healthy outcomes would follow.

Autonomous self-regulation of behavior has been associated with well-being and other positive outcomes in a variety of settings including: education (Grolnick, Ryan, & Deci, 1991), institutions for the aged (Kasser & Ryan, 1999), close relationships (Blais, Sabourin, Boucher, & Vallerand, 1990), political attitudes (Koestner, Losier, Vallerand, & Carducci, 1996), religious behavior (Ryan, Rigby, & King, 1993), and health care (Williams, Grow, Feedman, Ryan, & Deci, 1996).

The concept of individual difference in regulatory style for withholding negative affect is considered a relatively stable aspect of personality. That is, it is not a state that fluctuates easily as a function of the situation, but neither is it a stable trait that can not be affected over time. Rather, it is relatively stable over time but can be influenced by factors such as therapeutic interventions.

Overview

Study 1 was intended to develop a scale to measure individual differences in people's motivation for withholding expression of negative affect. Developed from an SDT perspective, the scale assesses the degree to which people have internalized the rationale for withholding negative affect.

When the regulation of negative affect has been fully internalized, individuals will be aware of their negative affect and may withhold it because they choose not to express the emotion, rather than because they feel pressured to withhold it. The validity of the proposed scale was tested to determine the extent to which it related (a) to other measures of emotion and emotion management (Study 1), (b) to measures of coping (Study 2), and (c) to global social contexts such as culture and gender (Study 3). The use of samples from different cultures was done to increase the generalizability of the proposed scale's reliability and validity.

Study 1: Development of the Self-Regulation of Withholding Negative Emotions Questionnaire

Four groups of existing scales were included in Study 1 to establish the relation of the SRWNE subscales to other constructs: (a) scales related to the constructs of SDT (i.e., the General Causality Orientations Scale and the Self-Determination Scale); (b) scales related to interpersonal styles (i.e., Attachment Styles and the Self-Consciousness Scale); (c) scales that measure emotion and emotion management [i.e., Affect Intensity, Trait Meta-Mood Scale (TMMS), Negative Mood Regulation (NMR), Ambivalence over Emotional Expression (AEQ), and the Emotional Expressiveness Questionnaire (EEQ)]; and (d) scales that assess the degree of global adjustment or well-being [i.e., the Weinberger Adjustment Inventory (WAI), Life Satisfaction, Center for Epidemiological Studies-Depression Scale (CES-D), and Cohen-Hoberman Inventory of Physical Symptoms (CHIPS)], the latter would allow a preliminary examination of the relation of the style

of withholding expression of negative affect to health. For all statistical tests, we used a tolerance level for Type I error of .05.

Method

Participants

Participants were 168 college students (88 men, 79 women, one unspecified) who received course credit in an introductory psychology course at the University of Rochester. Participants worked in small groups of up to 20 to complete a packet of questionnaires. Participants were fully debriefed.

The Self-Regulation of Withholding Negative Emotion Questionnaire

An initial pool of 33 items represented the four self-regulatory styles (Ryan & Connell, 1989): external regulation (7 items); introjected regulation (9 items); identified regulation (7 items); and integrated regulation (10 items). The number of items was relatively small for a scale construction project. However, the items were all adapted from self-regulation questionnaires that used the SDT framework and were validated in different domains, so we assumed we would be able to select a subset of these items that would yield adequate reliability coefficients.

The scale was constructed to assess the motivational reasons for withholding expression of negative emotions using two stems: one concerning, "why do you not express your negative emotions to other people?" (with 17 items); and the other concerning, "why do you sometimes act like everything is all right, even though you are upset?" (with 16 items). Participants responded to the randomly ordered 33 items on a 7-point scale anchored by 1 = strongly disagree and 7 = strongly agree. A composite score for each of the four subscales was obtained by averaging the relevant items in that subscale across the two stems.

Sample items are: for external regulation, "I'm afraid that people wouldn't like me if I expressed my feelings"; for introjected regulation, "I don't think I have the right to bother other people with my negative feelings"; for identified regulation, "It is important for me personally not to be hurtful to others"; and for integrated regulation, "I find it personally satisfying to be able to feel my emotions without letting them be disruptive."

To improve the internal consistency of each subscale, one item was dropped from the introjected pool; three items were moved from the integrated subscale to the identified subscale based on correlations among the two subscale items, (the identified and integrated subscales share a theoretical boundary on the self-determination continuum); and two items were dropped from the initial identified pool and two from the integrated pool due to low item-total correlations.

The resulting 28-item Self-Regulation of Withholding Negative Emotions (SRWNE) questionnaire is shown in the Appendix, and Table 1 shows the descriptive statistics for the scale. The four subscales of the SRWNE were shown to have adequate reliabilities ($.67 < \alpha s < .78$). The simplex structures of the SRWNE were supported by the pattern of correlations among the subscales. As depicted in Table 2, subscales were more strongly correlated with others that are theoretically adjacent than with those that are more distant.

Insert Tables 1 and 2 about here

Then, the subscale scores were standardized and the standardized scores of the external and the introjected regulation subscales were added to create a controlled index (CI) for withholding expression. The standardized scores of the identified and the integrated regulation subscales were added to create an autonomy index (AI), and relative autonomy index for withholding expression

(RAI) was created by subtracting the CI from the AI. Table 2 also shows the correlations of the four SRWNE subscales with the indices, CI, AI, and RAI.

A series of t-tests was performed to examine gender differences on each subscale, the AI, the CI, and the RAI. As shown in Table 1, there were no significant gender differences on the four subscales or on the indices, although men scored marginally higher than women on integrated regulation, t (1, 165) = 1.78, $p < .09$[1].

Other Measures

General Causality Orientations Scale (GCOS). This 36-item scale (Deci & Ryan, 1985b) assesses individual differences in three general motivational orientations: the autonomy orientation, the control orientation, and the impersonal orientation. Only the autonomy and control orientations were relevant to this study.

Self-Determination Scale (SDS). This ten-item scale (Sheldon & Deci, 1996) assesses a general tendency to be in contact with oneself and to feel a sense of choice in one's actions.

Attachment Style. Four paragraphs describe four prototypic attachment patterns resulting from a combination of people's positive and negative concepts of themselves and of others with whom they are in close relationships (Bartholomew & Horowitz, 1991). Four items indicate the degree of the individual's secure (positive self concept and positive other concept), preoccupied (negative self and positive other concepts), dismissing (positive self and negative other concepts), and fearful (negative self and negative other concepts) attachment styles.

Self-Consciousness Scale (SCS). Developed by Fenigstein, Scheier, and Buss (1975), the 23-item scale measures people's tendency to attend to aspects of their ongoing consciousness, including mood. The scale taps three aspects of self-consciousness: private self-consciousness, public self-consciousness, and social anxiety.

Affect Intensity Measure (AIM). This 40-item measure by Larsen and Diener (1987) was designed to assess the characteristic strength of people's emotional experiences.

Trait Meta-Mood Scale (TMMS). This scale (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) measures individuals' ability to identify feelings and regulate these feelings in order to motivate adaptive social behaviors. The short form of the TMMS consists of 24 items to measure individual differences in attention to mood, clarity in discriminating among feelings, and beliefs about maintaining positive moods and repairing negative moods.

Negative Mood Regulation (NMR). Catanzaro and Mearns (1990) developed a 30-item measure of generalized beliefs that behaviors or cognitions can alleviate a negative mood state.

Ambivalence over Emotional Expressiveness Questionnaire (AEQ). King and Emmons (1990) developed a 28-item scale to measure people's ambivalence about emotional expression. It includes wanting to reveal emotions and wanting to hide them.

Emotional Expressiveness Questionnaire (EEQ). King and Emmons (1990) also developed a 16-item scale to measures the tendency to express a variety of positive and negative emotions.

Weinberger Adjustment Inventory-Short Form (WAI-S). This 35-item measure assesses socio-emotional adjustment for non-clinical populations (Weinberger, 1990). The scale consists of three subscales: restraint, distress, and repressive defensiveness.

Life Satisfaction. The Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) is a five-item scale designed to measure global cognitive-judgmental aspects of subjective well-being, but not to tap related constructs, such as positive affect or loneliness.

Center for Epidemiological Studies Depression Scale (CES-D). This 20-item measure assesses depressive symptoms within the general population (Radloff, 1977).

Cohen-Hoberman Inventory of Physical Symptoms (CHIPS). The 36 item scale measures the degree of seriousness of each physical ailment, excluding psychological symptoms, such as depression (Cohen & Hoberman, 1983).

Results

All scales included in the present study were found to be reasonably reliable (all αs were greater than .63, most were greater than .75).

Correlations Among Measures

The subscale scores of the existing emotion measures were subjected to a higher-order factor analysis to examine underlying common variances among the measures, after dropping the Affect Intensity Measure and the repressive defensiveness scales because they were not correlated with any SRWNE subscales. The higher-order factor analysis with varimax rotation extracted five factors with eigenvalues greater than 1 (60.7% of the variance was explained).

Negative mood regulation, repair, life satisfaction, self-determination, restraint, and clarity loaded positively, while CES-D, distress, and CHIPS loaded negatively, on the first factor (eigenvalue = 6.35). It was labeled optimism, because it seemed to capture a global optimistic view. Social-anxiety, preoccupied attachment style, and Ambivalence about Emotional Expressiveness loaded positively and Emotional Expressiveness loaded negatively on the second factor (eigenvalue = 2.25). It was labeled social-anxiety because the scale with the highest positive loading was the social anxiety scale. Private self-consciousness, attention, and autonomy orientation loaded positively on the third factor (eigenvalue = 1.56), which was named awareness, because this factor seemed to tap into being aware of one's emotions. The fearful and dismissing attachment styles loaded positively, and the secure attachment style loaded negatively on the fourth factor (eigenvalue = 1.36), which was labeled mistrust of others. The control

orientation and public self-consciousness loaded positively on the fifth factor (eigenvalue = 1.23), which was called external focus.

The five factor composites were subjected to Pearson correlational analyses with four SRWNE subscales and three indices (the upper half of Table 3). The controlled SRWNE subscales (i.e., external and introjected regulation, and controlled index) were strongly associated with all factors. Specifically, the controlled SRWNE seems to tap into pessimism, social anxiety, mistrust of others, external locus of causality, and lack of emotional awareness. The autonomous SRWNE subscales (i.e., identified and integrated regulation, and autonomous index) were also positively associated with social anxiety and mistrust of others, which suggests that no matter what one's reasons for withholding negative emotion, the withholding is related to social anxiety and mistrust. Finally, RAI was related to optimism, emotional awareness, internal locus of causality, and lack of social anxiety.

Insert Table 3 about here

Among the four SRWNE subscales, the controlled ones showed stronger correlations with existing emotion measures than did the autonomous SRWNE subscales. These correlations suggest that the emotion measures may be reflecting characteristics of emotional regulation that are controlled by interpersonal or intrapersonal forces, rather than being characteristics of emotional regulation that is truly chosen by the self. Further, the controlled SRWNE subscales were positively associated with psychological/physical ill-being indices (e.g., life dissatisfaction, depression, and symptom reports).

Comparison with the AEQ

The SRWNE appears, theoretically as well as empirically, to measure a construct similar to the ambivalence about expressing emotion questionnaire (AEQ: King & Emmons, 1990). The correlations ranged from .24 to .65 with subscales in the SRWNE (ps < .01), so further comparisons between the SRWNE and the AEQ were examined. First, the AEQ score was regressed onto the four subscales of the SRWNE to test whether all four SRWNE subscales share variance with the AEQ. The four subscale scores were entered simultaneously in the regression equation and revealed that only external regulation was significantly associated with the AEQ (Table 4). The other three subscales did not contribute significant variance to prediction of the AEQ (ps > .22).

Insert Table 4 about here

Next, the degree to which the scales predict depression and physical symptoms was examined. When the four SRWNE subscales and the AEQ score were entered in the regression equation simultaneously, both identified regulation and the AEQ scores marginally predicted depressive symptoms, and only introjected regulation significantly predicted physical symptoms. Thus, the SRWNE seems to measure a broader construct than the AEQ, covering various motivations other than external reasons for emotional self-regulation, and the SRWNE appears to be a better predictor of ill-being.

In sum, Study 1 validated a scale to measure the degree to which the regulation for withholding expression of negative affect had been fully internalized. A 28-item SRWNE was finalized with adequate reliabilities and the expected simplex structures for four subscales. In general, scores on the SRWNE were found to have adequate reliability and some validity was obtained for the scale. In the next two studies, the validity of the SRWNE was further examined.

Study 2: Validity and Reliability

Emotional self-regulation involves coping with stress, and the types of emotional regulatory processes one employs may result in different mental and physical consequences. Thus, the extent to which the SRWNE relates to measures of coping and general health was explored in Study 2.

Method

Participants

Three hundred and five introductory psychology students (96 men, 209 women) at the University of Rochester, participated. They completed a questionnaire packets (including the SRWNE) at the beginning of a semester (Time 1) and completed the SRWNE questionnaire again approximately eight weeks later (Time 2), so test-retest reliability could be assessed.

Measures

The questionnaire packet included the 28-item SRWNE and the following measures.

General Affect. A 20-item Positive and Negative Affect Schedule (PANAS: Watson, Clark, & Tellegen, 1988) was used to assess general feelings, using a 5-point Likert response format. Scores for the ten positive and ten negative adjectives were averaged within the subscales to form individual difference composite scores for general positive affect (PA) and general negative affect (NA). Sample PA adjectives are "interested and proud" and NA are "distressed and hostile."

Coping. A 72-item revised COPE (Carver, Scheier, & Weintraub, 1989), developed by Zuckerman and Gagne (2000), was used to measure general coping strategies. It includes 18 coping strategies: ten original COPE subscales, one revised subscale, and seven additional subscales. A 4-point Likert response format was used. Coping strategies were active coping, planning, suppression of competing activities, restraint coping, instrumental support-seeking, positive interpretation, acceptance, denial, behavioral disengagement, emotional support-seeking,

mental disengagement, expressing emotion, understanding emotion, repairing emotion, other-blame, replacement, self-focused rumination, and self-blame.

General Health. A 28-item General Health Questionnaire (GHQ: Golberg &Hillier, 1979) assessed mental and physical health status concerning anxiety, depression, social dysfunction, and somatics, using a 4-point Likert response format. Participants rated the extent to which they experienced each symptom during the previous three weeks. A general health composite was formed by reversing and averaging the four subscale scores. Higher scores indicate better health.

Results

Means, SD's, and alpha's for the SRWNE subscales at Time 1 and Time 2 are reported in the left two columns of Table 5. Scores for all subscales had adequately reliability (αs > .75). Test-retest reliabilities for subscale scores over a period of 8-week were also adequate (rs > .61, ps < .001). As in Study 1, the SRWNE subscales yielded a simplex structure, here at both Time 1 and Time 2. A series of t-test revealed no gender differences on the subscale scores.

Insert Table 5 about here

Relations Among Constructs

The subscale scores of the existing coping and general health measures were subjected to a higher-order factor analysis to examine underlying common variances among the measures. The higher-order factor analysis with varimax rotation extracted six factors with eigenvalues greater than 1 (64.8% of the variance was explained). General health composite, anxiety, somatics, depression, negative affect, and dysfunction loaded positively on the first factor (eigenvalue = 5.50), labeled psychosomatics. Active coping, planning, positive interpretation, positive affect, and repairing loaded positively on the second factor (eigenvalue = 4.38), labeled

problem-focused coping. Emotional support-seeking, expressing emotion, instrumental support-seeking, and understanding emotion positively loaded on the third factor (eigenvalue = 1.95), named support seeking. Behavioral disengagement, denial, other-blame, mental disengagement, and replacement positively loaded on the fourth factor (eigenvalue = 1.81), labeled denial. Self-blame and self-focused rumination positively loaded on the fifth factor (eigenvalue = 1.44), named self-blame. Acceptance and restraint coping positively loaded on the sixth factor (eigenvalue = 1.34), labeled acceptance.

The six factor composites were then subjected to Pearson correlational analyses with four SRWNE subscales and three indices (the lower half of Table 3). Controlled SRWNE subscales (external and introjected regulation, and controlled index) were strongly associated with all factors except acceptance. The controlled SRWNE seems to tap into psychosomatics, rumination, denial, pessimism, and lack of both problem-focused coping and support seeking. Autonomous SRWNE subscales (identified and integrated regulation, and autonomous index) were also positively associated with rumination and negatively associated with support seeking, which suggests that no matter what one's reasons for withholding negative emotion, the withholding is related to self-focused rumination and avoiding social support. Finally, RAI was related to support seeking and acceptance, and lack of psychosomatics, denial, and self-focused rumination. These correlations are consistent with those in Study 1, suggesting that the RAI relates as expected to various coping strategies and predicts individuals' general health status.

Comparing Styles of SRWNE with Coping Strategies

Because the SRWNE appears to relate closely, both theoretically and empirically, to coping strategies such as expressing emotions, ($-.29 < \underline{r}s < -.13$, $\underline{p} < .05$, with subscales in the SRWNE), active coping, positive interpretation, and repairing emotion ($.32 < \underline{r}s < .35$, $\underline{p} < .001$, with the RAI), further comparison of the SRWNE was examined. The four SRWNE subscale scores were

entered simultaneously into a set of four regression equations in order to predict variance in the four variables of expressing emotions, active coping, positive interpretation, and repairing emotion. The results, shown in the upper portion of Table 6, revealed that expressing emotions was predicted negatively by introjected regulation and that the other three subscales did not contribute independent variance. Active coping was predicted negatively by introjected regulation and positively by integrated. Both positive interpretation and repairing emotion were predicted negatively by external regulation and positively by integrated.

Insert Table 6 about here

We examined whether the SRWNE subscales and the four coping subscales account for variance in self-reports of general health. When the scores were entered in the regression equation simultaneously (see lower portion of Table 6), the general health composite was predicted negatively by external and introjected regulation and positively by repairing emotion, indicating that external and introjected scores were associated with poorer health and that repairing emotion scores were associated with better health. Identified and integrated regulation, active coping, positive interpretation, and expressing emotions were unrelated to the general health composite.

Individual subscales of the GHQ were also examined, using the same regression equation. Anxiety and depression were significantly positively predicted by external regulation and negatively by repairing emotion. Social dysfunction was not significantly predicted by any subscales. Somatization was positively predicted by introjected regulation and negatively by repairing emotion. In general, the results showed that controlled regulation and the repairing

emotion coping strategy were better predictors of health status than were autonomous regulation and the other coping strategies studied.

The results in Study 2 showed acceptable test-retest reliability for scores on the SRWNE and demonstrated that the SRWNE construct was related in expected ways to various coping styles and health outcomes. The SRWNE subscales were associated with mental and physical adjustment measures cross-sectionally and had better external validity than the existing modes of coping such as active coping, positive interpretation, and expressing-emotions.

Study 3: Comparability Test of the SRWNE

Emotional self-regulation requires internalizing values and regulatory processes, resulting in individual differences in the degree to which the value of regulating emotions is integrated with people's core self. Self-determination theory posits that the internalization process is universal but that social contexts and thus cultures, may facilitate or inhibit individuals' internalization process, reflecting differing cultural emphases on emotional self-regulation. For example, collectivistic cultures, such as Korea, compared to individualistic cultures, such as the U. S., emphasize collective identity, emotional dependence, and behavioral regulation by in-group norms (Bond, 1998; U. Kim, 1994; Triandis, McCusker, & Hui, 1990). Such emphasis on establishing an interpersonal harmony and considering in-group members' well-being as they deal with their own emotions, may be perceived as pressure or external control, and could result in Koreans engaging in more controlled emotional regulation than Americans.

In this study, we also examined the influence of gender on the internalization of the value of emotional withholding by Americans and Koreans (Cross & Madson, 1997).

Method

Participants

Three hundred twenty-six college students (153 men, 173 women) at Yonsei University, Seoul, South Korea volunteered to complete the 28-item SRWNE.

Results

Means, standard deviations, and alphas for the SRWNE subscale scores are reported in the third column of Table 5. Correlations among SRWNE subscales, which are below the diagonal in Table 2, support the simplex structure. A series of t-test revealed no gender differences on SRWNE subscales.

Test for Measurement Comparability of the Emotional Self-Regulation Construct

A confirmatory factor analysis was conducted to examine the equivalence of measurement structure of the SRWNE questionnaire (construct comparability) across two cultures and two genders, comparing Study 2 and Study 3 data sets. To examine the mean level relations across two cultures and two genders, multiple-group mean structures analysis with AMOS 4.0 (Arbuckle & Wothke, 1999) was used. In addition to the variance-covariance information of standard structural equation modeling (SEM) analyses, mean-levels were analyzed (Little, 1997). Two questions could be answered directly: (a) whether the same underlying dimension is measured with little or no bias across multiple groups (i.e., measurement equivalence of the constructs), and (b) whether there are similarities and differences across groups on the error-free means of the latent constructs (i.e., construct comparability). We used four fit indices: root mean squared error of approximation (RMSEA), normed fit index (NFI), Tucker-Lewis Index (TLI), and comparative fit index (CFI). Adequate fit of a specified model to the data is indicated when the RMSEA has a value less than .05 (Browne & Cudeck, 1993) and the NFI, TLI, and CFI have values greater than .9 (Marsh, Balla, & McDonald, 1988; Tanaka & Huba, 1989).

Model Specification. The validity of assessing latent variables in this study utilizing sets of observed variables was examined. Model parameters were specified as follows. Three SRWNE subscales [i.e., external (ER), introjected (JR), and integrated regulation (TR)] as constructs were each measured by two observed variables (i.e., er1 and er2 for ER, jr1 and jr2 for JR, and tr1 and tr2 for TR), and identified regulation (DR) as a construct was measured by three observed variables (i.e., dr1, dr2, dr3)[2]. Each observed variable was created by averaging two to four items within relevant subscales. The four constructs were allowed to correlate with each other, reflecting the simplex structure of the SRWNE scale. The observed variables for each relevant latent variable were specified not to have a zero loading on the relevant factor while the loadings on the other factor were constrained to equal zero. For example, er1 and er2 were specified not to have a zero loading on ER, while the loadings on measures for other SRWNE factors (i.e., JR, DR, and TR) were constrained to equal zero. Elements in the error matrices of the observed variables were freed to correlate diagonally. Additionally, measurement error variances between er2 and tr2, jr2 and dr1, jr2 and dr2, jr2 and dr3, and dr3 and tr1 were freed to correlate with each other in order to improve the model fit. All other off-diagonal elements in the error matrices were fixed to zero. These specifications were equated across two cultures and two gender groups.

The fit of the specified model with no cross-group equality constraints as a basic model which is deeply grounded in theory showed satisfactory fit (RMSEA = .03, NFI = .96, TLI = .99, and CFI = .98), indicating that the general structure is tenable. First, to test for measurement equivalence, invariance of the factor loadings was enforced. The overall model fit was still quite satisfactory (RMSEA = .04, NFI = .95, TLI = .99, and CFI = .97). Second, invariance of the intercepts was added and the overall model fit was again acceptable (RMSEA = .10, NFI = .96, TLI

= .94, and CFI = .96). The results indicate that the SRWNE constructs have equivalent measurement properties and are comparable across cultures and genders (see Little, 1997).

Tests for Socio-cultural Differences on Autonomous Regulation of Withholding

Because construct comparability was tenable, equality of the latent means and equality of the latent covariances were tested across the four groups. All corresponding parameters (viz., factor loadings, intercepts, and error variances of observed variables) were freed for the first group and set to be invariant for the other groups. The estimated latent factor means were fixed to 0 and standard deviations were fixed to 1 in the first group and freed in the subsequent groups, thus a given construct's mean and standard deviation could be identified and estimated as a relative difference from the reference point estimated in the first group (McArdle & McDonald, 1984). The covariances among factors were freed in the first group and estimated in the subsequent groups using the same pattern and starting value with the first group.

The fit of the specified model for both cultures and genders without equal constraints on construct means and variances was satisfactory, χ^2 (158) =644.32, RMSEA = .07, NFI = .96, TLI = .97, and CFI = .97. When only the construct means were added to be specified as invariant, the fit of the model was satisfactory but significantly worsened, χ^2 (170) = 932.21, RMSEA = .09, NFI = .95, TLI = .95, and CFI = .95; χ_{diff}^2 (12) = 287.89, $p < .01$. When only the variances among constructs were added to be specified as invariant without equal constraint on construct means, the fit of the model was again satisfactory but the difference was statistically significant, χ^2 (170) = 680.25, RMSEA = .07, NFI = .96, TLI = .97, and CFI = .97; χ_{diff}^2 (12) = 35.93, $p < .01$. As shown in the upper portion of Table 7, differences in construct means were found between cultures but not between genders. The construct means for external regulation, introjected regulation, and identified regulation were significantly higher for men and women in the Korean sample than for

men and women in the U. S. sample, while the construct mean for integrated regulation was not significantly different by groups (ps > .27). The construct variances, shown in the middle portion of Table 7, for all four constructs were significantly different for all three comparison groups from the reference group of Korean men. Correlations among four latent variables across the groups are reported in the bottom portion of Table 7. Correlation between introjected and integrated regulation was greater for the group of Korean men than for other groups. Correlations between identified and integrated regulation and between introjected and identified regulation of Korean men were greater than those of Korean women.

Insert Table 7 about here

In summary, the measurement of autonomous emotional regulation using the SRWNE was comparable across two cultures and across genders, but the construct means were different between cultures and the construct variances were different among culture-gender groups. Correlations between SRWNE subscales seemed to be greater for Korean men than for the other groups.

General Discussion

Three studies presented initial evidence of the reliability and validity individual difference scores for people's motivation to withhold expression of negative affect. The scale is intended for use in studies examining issues concerning the relation of negative affect to health. Reasonable reliability and validity were demonstrated, using samples from two disparate cultures.

The SRWNE as an Emotion Regulation Measure

The results of the present studies demonstrated validity for the SRWNE scale. For example, the SRWNE subscales were correlated in expectable ways with various emotion management scales such as the ambivalence about expressing emotion questionnaire (AEQ: King & Emmons,

1990). The SRWNE subscales were also correlated with various coping strategies measured by the well-validated COPE scale (Carver et al., 1989). In particular, expressing emotions and repairing emotions related to the SRWNE subscales in a way that provided convergent validity, while at the same time showing that different SRWNE subscales predicted different coping strategies.

When accounting for variance in depression and general health, subscales of the SRWNE performed better than the other measures used. For example, introjected regulation significantly predicted physical symptom reports (Study 1 and Study 2), while none of the other measures, except coping by repairing emotion, significantly predicted such outcomes. Lack of awareness of negative emotions accompanied by a nonintegrated regulatory style seems to aggravate negative emotional experiences and somatic symptoms (Ryan, Deci, & Grolnick, 1995); whereas, a coping skill of changing negative emotions to positive ones accompanied by an integrated regulatory style seems to diminish negative emotional experiences and somatic symptoms.

Measurement Equivalence of the Autonomous Emotional Regulation Constructs

The structure of the SRWNE appears comparable across two cultures and genders, although the construct means were different in the two cultures. The Korean sample scored higher than the U. S. sample on controlled emotional regulation (i.e., external and introjected regulation) and on identified regulation. The Neo-Confucian theory of emotion (see Hahn & Chon, 1994), which has been embedded in Korean's psychological characteristics, emphasizes a balance between personal and social appropriateness in emotional regulation. *We-ness* (Choi & Choi, 1994), which has been identified as Korean's indigenous psychology, reflect both the synthetic collectivism based on genuine concern for others over the self and an unconditional emotional bond between in-group members and the integrated collectivism as based on pursuing social interest that is in harmony with personal fulfillment (Choi & Choi, 1994; Hahn & Chon, 1994).

Emphasizing *we-ness* regarding emotional regulation in the Korean culture seems to be perceived as pressure or external control, resulting in Koreans engaging in a more controlled emotional regulation than do Americans, who live in an individualistic culture. However, Koreans also scored higher on identified regulation, suggesting that Korean, relative to Americans, are also more characterized by believing it is personally important to regulate their negative emotions for the good of the collective.

Future Research and Conclusions

Because chronic dysfunctional emotional regulation has been associated with physical illnesses such as arthritis, asthma, breast cancer, and coronary heart disease (see Pennebaker, 1995), it is necessary to examine styles of emotional self-regulation and physical health, using a longitudinal format and diverse populations to ascertain whether more autonomous styles of regulation can buffer the adverse effects of stress on health. If it does, an intervention program aimed at helping individuals develop more autonomous emotional regulatory styles may be useful to help ameliorate such serious long-term physical risks.

All three studies were based on self-report data, which is a limitation, so behavioral and physiological data should be included in future work.

In sum, reasonable reliability and validity were obtained concerning the Self-Regulation of Withholding Negative Emotions Questionnaire in three studies using college students from two cultures, indicating that the style of regulating the inexpression of negative emotions does seem to make a difference regarding coping and health.

References

Arbuckle, J. L., & Wothke, W. (1999). Amos 4.0 User's Guide. Chicago: Small Waters Coporation.

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. Journal of Personality and Social Psychology, 61, 226-244.

Beutler, L. E., Engle, D., Oro-Beutler, M. E., Daldrup, R., & Meredith, K. (1986). Inability to express intense affect: A common link between depression and pain. Journal of Consulting and Clinical Psychology, 54, 752-759.

Blais, M. R., Sabourin, S., Boucher, C., & Vallerand, R. J. (1990). Toward a motivational model of couple happiness. Journal of Personality and Social Psychology, 59, 1021-1031.

Bonanno, G. A., Davis, P. J., Singer, J. L., & Schwartz, G. E. (1991). The repressor personality and avoidant information processing: A dichotic listening study. Journal of Research in Personality, 25, 368-401.

Bond, M. H. (1988). Finding universal dimensions of individual variation in multicultural studies of value: The Rokeach and Chinese value survey. Journal of Personality and Social Psychology, 55, 1009-1015.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), Testing structural equation models (pp. 136 –162). Newbury Park, CA: Sage.

Buck, E. (1984). The communication of emotion. New York: Guilford.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. Journal of Personality and Social Psychology, 56, 267-283.

Catanzaro, S. J., & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. Journal of Personality Assessment, 54, 546-563.

Choi, S-C., & Choi, S-H. (1994). We-ness: A Korean discourse of collectivism. In G. Yoon & S-C, Choi (Eds.), Psychology of the Korean people: Collectivism and individualism (pp. 57-84). Seoul, Korea: Dong-A.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. Journal of Applied Social Psychology, 13, 99-125.

Cox, T., & McKay, C. (1982). Psychological factors and psychophysiological mechanisms in the etiology and development of cancers. Social Science and Medicine, 16, 381-396.

Cross, S. E., & Madson, L. (1997). Models of the self: Self-construals and gender. Psychological Bulletin, 122, 5-37.

Dattore, P. J., Shontz, F. C., & Coyne, L. (1980). Premorbid personality differentiation of cancer and noncancer groups: A test of the hypothesis of cancer proneness. Journal of Consulting and Clinical Psychology, 48, 388-394.

deCharms, R. (1968). Personal causation: The internal affective determinants of behavior. New York: Academic Press.

Deci, E. L., & Ryan, R. M. (1985a). Intrinsic motivation and self-determination in human behavior. New York: Plenum.

Deci, E. L., & Ryan, R. M. (1985b). The General Causality Orientations Scale: Self-determination in personality. Journal of Research in Personality, 19, 109-134.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, G. (1985). The Satisfaction with Life Scale. Journal of Personality Assessment, 49, 71-75.

Engebretson, T. O., Matthews, K. A., & Scheier, M. F. (1989). Relations between anger expression and cardiovascular reactivity: Reconciling inconsistent findings through a matching hypothesis. Journal of Personality and Social Psychology, 57, 513-521.

Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. Journal of Personality and Social Psychology, 43, 522-527.

Friedman, H. S., & Booth-Kewley, S. B. (1987). The "disease-prone personality": A meta-analytic view of the construct. American Psychologist, 42, 539-555.

Golberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. Psychological Medicine, 9, 139-145.

Goldstein, H. S., Edleberg, R., Meier, C. F., & Davis, L. (1988). Relationship of resting blood pressure and heart rate to experienced anger and expressed anger. Psychosomatic Medicine, 50, 321-329.

Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. Journal of Educational Psychology, 83, 508-517.

Hahn, D-W., & Chon, K-K (1994). Individualism-collectivism from the perspective of Toegye's Neo-Confucianism: Analytical, synthetical, or integrated collectivism? In G. Yoon & S-C, Choi (Eds.), Psychology of the Korean people: Collectivism and individualism (pp. 27-53). Seoul, Korea: Dong-A.

Haynes, S. G., Feinleib, M., & Kannel, W. B. (1980). The relationship of psychosocial factors to coronary heart disease in the Framingham study: III. Eight year incidence of coronary heart disease. American Journal of Epidemiology, 111, 37-54.

Hecker, M. H., Chesney, M. A., Black, G. W., & Frautschi, N. (1988). Coronary-prone behaviors in the Western Collaborative Group Study. Psychosomatic Medicine, 50, 153-164.

Jensen, M. R. (1987). Psychobiological factors predicting the course of breast cancer. Journal of Personality, 55, 317-342.

Kasser, V. G., & Ryan, R. (1999). The relation of psychological needs for autonomy and relatedness to vitality, well-being, and mortality in a nursing home. Journal of Applied Social Psychology, 29, 935-954.

Katz, I. M., & Campbell, J. D. (1994). Ambivalence over emotional expression and well-being: Nomothetic and idiographic tests of the stress-buffering hypothesis. Journal of Personality and Social Psychology, 67, 513-524.

Kim, U. (1994). Introduction to individualism and collectivism: Conceptual clarification and elaboration. In U. Kim, H. C. Triandis, C. Kagiticibasi, S. C. Choi, & G. Yoon (Eds.), Individualism and collectivism: Theory, method, and application (pp. 19-40). Beverly Hills, CA: Sage.

King, L. A., & Emmons, R. A. (1990). Conflict over emotional expression: Psychological and physical correlates. Journal of Personality and Social Psychology, 58, 864-877.

Koestner, R., Losier, G. F., Vallerand, R. J., & Carducci, D. (1996). Identified and introjected forms of political internalization: Extending self-determination theory. Journal of Personality & Social Psychology, 70, 1025-1036.

Kohn, P. M., Lafreniere, K., & Gurevich, M. (1991). Hassles, health, and personality. Journal of Personality and Social Psychology, 61, 478-482.

Lanzetta, J. T., Cartwright-Smith, J., & Eleck, R. E. (1976). Effects of nonverbal dissimulation on emotional experience and autonomic arousal. Journal of Personality and Social Psychology, 33, 354-370.

Larsen, R. J., & Diener, E. (1987). Affect intensity as an individual difference characteristic: A review. Journal of Research in Personality, 21, 1-39.

Little, T. D. (1997). Mean and covariance structures (MACS) analyses of cross-cultural data: Practical and theoretical issues. Multivariate Behavioral Research, 32, 53-76.

MacDougall, J. M., Dembroski, T. M., Dimsdale, J. E., & Hackett, T. P. (1985). Components of Type A, hostility, and anger-in: Further relationships to angiographic findings. Health Psychology, 4, 137-152.

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. Psychological Bulletin, 103, 391-410.

McArdle, J. J., & McDonald, R. P. (1984). Some algebraic properties of the Reticular Action Model for moment structures, British Journal of Mathematical & Statistical Psychology, 37, 234-251.

Pennebaker, J. W. (1995). Emotion, disclosure, & health. Washington, DC: American Psychological Association.

Pennebaker, J. W., & Lightner, J. M. (1988). Competition of internal and external information in an exercise setting. Journal of Personality and Social Psychology, 39, 165-174.

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. Journal of Applied Psychological Measurement, 1, 385-401.

Richman, J. A. (1988). Deviance from sex-linked expressivity norms and psychological distress. Social Forces, 67, 208-215.

Rosenthal, R., & Rosenow, R. L. (1991). Essentials of behavioral research: Methods and data analysis (2nd ed.). New York: McGraw-Hill.

Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. American Psychologist, 41, 813-819.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. Journal of Personality and Social Psychology, 57, 749-761.

Ryan, R. M., Deci, E. L., & Grolnick, W. S. (1995). Autonomy, relatedness, and the self: Their relation to development and psychopathology. In D. Cicchetti, D. J. Cohen et al (Eds). Developmental

psychopathology, Vol. 1: Theory and methods. Wiley series on personality processes. (pp. 618-655). New York, NY: John Wiley & Sons.

Ryan, R. M., Rigby, S., & King, K. (1993). Two types of religious internalization and their relations to religious orientations and mental health. Journal of Personality and Social Psychology, 65, 586-596.

Salovey, P., Mayer, J. D., Goldman, S., Turvey, C., & Palfai, T. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta-Mood Scale. In J. W. Pennebaker (Ed.), Emotion, disclosure, and health (pp. 125-154). Washington, D.C.: American Psychological Association.

Schwartz, G. E. (1990). Psychobiology of repression and health; A systems approach. In J. L. Singer (Ed.), Repression and dissociation: Implications for personality theory, psychopathology, and health (pp. 405-434). Chicago: University of Chicago Press.

Sheldon, K., & Deci, E. L. (1996). The Self-Determination Scale. Unpublished manuscript, University of Rochester.

Tanaka, J. S., & Huba, G. J. (1989). A general coefficient of determination for covariance structure models under arbitrary GLS estimation. British Journal of Mathematical & Statistical Psychology, 42, 233-239.

Triandis, H. C., McCusker, C., & Hui, C. H. (1990). Multimethod probes of individualism and collectivism. Journal of Personality and Social Psychology, 59, 1006-1020.

Udelman, H. D., & Udelman, D. L. (1981). Emotions and rheumatologic disorders. American Journal of Psychotherapy, 35, 576-587.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology, 54, 1063-1070.

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: Exploring the central role of negative affectivity. Psychological Review, 96, 234-254.

Weinberger, D. A. (1990). The construct validity of the repressive coping style. In J. L. Singer (Ed.), Repression and dissociation: Implications for personality theory, psychopathology, and health (pp. 405-434). Chicago: University of Chicago Press.

Williams, G. C., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. Journal of Personality and Social Psychology, 70, 115-126.

Zuckerman, M., & Gagne, M. (2000). Revising the COPE: Implications for coping theory. Unpublished manuscript. University of Rochester.

Footnotes

1. Gender differences were also examined at the item level and were found in three items that men scored higher than women: item 24 (introjected regulation: men M = 3.02, women M = 2.27, t (165) = 3.01), item 28 (introjected regulation: men M = 2.13, women M = 1.62, t (165) = 2.86), and item 3 (integrated regulation: men M = 3.74, women M = 3.18, t (165) = 2.08).

2. Having three observed variables for the identified regulation latent variable improved the measurement model fit.

Author Note

Youngmee Kim, Edward L. Deci, and Miron Zuckerman, Department of Psychology, University of Rochester.

Study 1 in this article is based on a doctoral dissertation by the first author, supervised by the second author. We thank Hoonkoo Lee at Yonsei University for help with collection of the Korean data in Study 3, and members of the Human Motivation Research Group at the University of Rochester for their helpful inputs.

Correspondence concerning this article should be addressed to Youngmee Kim, Cancer Prevention and Control, Mount Sinai School of Medicine, One Gustave Levy Place, Box 1130, New York, NY 10029-6574. Electronic mail may be sent to youngmee.kim@mssm.edu.

Appendix

Self-Regulation of Withholding Negative Emotions (SRWNE) Questionnaire

There are a variety of reasons **when I do <u>not</u> express my negative emotions to other people**. Please read over the questions and indicate how much you agree or disagree with each reason using the scale provided.

Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
1	2	3	4	5	6	7

The reason when I do <u>not</u> express my negative emotions to other people is because:

ER___ 1. I think others would be upset with me, if I expressed these feelings.

JR___ 2. I would feel guilty if I let my bad feelings come out.

TR___ 3. I find it personally satisfying to be able to feel my emotions without letting them be disruptive.

JR___ 4. Expressing negative emotions would just hurt others, and a person shouldn't do that.

DR___ 5. There are some situations where it is useful to express my feelings and others where it's not.

JR___ 6. I would feel like a bad person if I expressed my bad feelings to my friends.

ER___ 7. My parents and friends expect me to control myself.

TR___ 8. I enjoy being aware of my feelings but I also find it satisfying to maintain a positive outward appearance.

DR___ 9. It is important to me personally not to be hurtful to others.

JR___ 10. I don't think I have the right to bother other people with my negative feelings.

DR___ 11. As a caring person, I do not want to upset others with my negative feelings.

ER___ 12. I'm afraid that people wouldn't like me if I express my feelings.

DR___ 13. It is important to be aware of my negative feelings, but if I keep them to myself it is to maintain emotional stability.

There are a variety of reasons **why I sometimes act like everything is all right, even though I am upset.** Please read over the questions and indicate how much you agree or disagree with each reason using the scale provided.

Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
1	2	3	4	5	6	7

Sometimes when I am upset, I act like everything is all right, because:

JR ___ 14. I'd be ashamed of myself if I let my bad feelings come out.

DR ___ 15. The important thing is to understand my own upset, but it may not be useful to tell others about it.

ER ___ 16. I think it could ruin my relationships if I am always talking about what bothers me.

DR ___ 17. It is important to me not to burden others with my problems.

TR ___ 18. It is gratifying to be able to keep my upset from interfering with my goals.

ER ___ 19. I want others to think I'm mature.

TR ___ 20. It is an interesting challenge to remain calm and not always be getting upset.

JR ___ 21. I would be embarrassed if I let others see what was bothering me.

DR ___ 22. I feel that it is mature to maintain a positive attitude.

TR ___ 23. It is fulfilling to be able to achieve my goals even when I am upset.

JR ___ 24. I believe people should keep their upset to themselves.

ER ___ 25. I'm afraid people won't like me if I let on what is wrong.

DR ___ 26. I choose to keep my bad feelings to myself so I can accomplish important projects.

ER ___ 27. I think I have to follow the social norms.

JR ___ 28. I want others to think I'm a good person.

Note: ER = external regulation; JR = introjected regulation; DR = identified regulation; and TR = integrated regulation

Table 1. Means and SD's for the Self-Regulation of Withholding Negative Emotions Questionnaire Subscales (Study 1)

	Final 28-item scale					
	# of items	mean (SD)	α	men	women	t(165)
External Regulation	7	3.69 (1.04)	.75	3.69	3.68	.05
Introjected Regulation	8	3.48 (1.05)	.78	3.58	3.36	1.37
Identified Regulation	8	4.53 (.81)	.67	4.48	4.58	-.79
Integrated Regulation	5	4.29 (1.17)	.73	4.44	4.13	1.78
Controlled Index		.00 (1.86)	.85	.09	-.13	.77
Autonomous Index		.00 (1.73)	.78	.07	-.08	.55
Relative Autonomous Index		.00 (1.79)	.88	-.02	.05	-.26

Table 2. Pearson Correlation Coefficients among the SRWNE Subscales and Indices (Study 1 and Study 3)

	1	2	3	4	5	6	7
1. External Regulation (ER)	-	.64	.49	.34	.91	.48	-.47
2. Introjected Regulation (JR)	.69	-	.56	.26	.91	.47	-.48
3. Identified Regulation (DR)	.32	.51	-	.49	.58	.86	.26
4. Integrated Regulation (TR)	.35	.34	.50	-	.33	.86	.52
5. Controlled Index (CI)	.92	.92	.46	.37	-	.53	-.52
6. Autonomous Index (AI)	.38	.49	.87	.87	.47	-	.45
7. Relative Autonomy Index (RAI)	-.56	-.46	.37	.45	-.55	.45	-

Note: All correlation coefficient are significant at $p < .001$;
Correlation coefficients above the diagonal are for Study 1 and below the diagonal are for Study 3
All correlation coefficients reported in this table were significant with the Bonferroni procedure (Rosenthal & Rosnow, 1991).

Table 3. Pearson Correlation Coefficients between Higher-order Factors of Emotion Measures (Study 1) or Coping/General Health Measures (Study 2) and SRWNE Subscales and Indices

	ER	JR	DR	TR	CI	AI	RAI
Study 1							
Factor 1: positivism	-.39***	-.34***	.02	.09	-.40***	.06	.48***
Factor 2: social-anxiety	.61***	.51***	.29***	.09	.60***	.22**	-.41***
Factor 3: awareness	-.10	-.23**	.00	.08	-.18*	.04	.23**
Factor 4: mistrust of others	.26***	.28***	.20**	.24**	.29***	.26**	-.05
Factor 5: external focus	.31***	.16*	.02	.01	.26**	.01	-.25**
Study 2							
Factor 1: psychosomatics	.36***	.32***	.08	-.01	.37***	.04	-.34***
Factor 2: problem-focused	-.23***	-.20***	.07	.23***	-.23***	.17**	.40***
Factor 3: support seeking	-.13*	-.27**	-.13*	-.08	-.22***	-.12*	.11+
Factor 4: denial	.34***	.26***	.04	.11+	.32***	.08	-.25***
Factor 5: rumination	.33***	.31***	.16**	.16**	.34**	.18**	-.18**
Factor 6: acceptance	-.03	-.03	.11+	.22***	-.03	.19***	.21***

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

N = 168 (Study 1); 305 (Study 2)

Note: ER: External Regulation; JR: Introjected Regulation; DR: Identified Regulation; TR: Integrated Regulation; CI: Controlled Index; AI: Autonomous Index; RAI: Relative Autonomy Index;
With the Bonferroni procedure, correlation coefficients for Study 1 may be due to chance if the significant level fails to reach $p < .01$; and correlation coefficients for Study 2 may be due to chance if the significant level fails to reach $p < .009$.

Table 4. Regression Analyses for Comparing the SRWNE with the AEQ (Study 1)

	AEQ (R^2 = .43)		Depression (R^2 = .11)		Physical Symptoms (R^2 = .05)	
	zero-order r	beta	zero-order r	beta	zero-order r	beta
ER	.65***	.54***	.24**	.17	.15*	.00
JR	.54***	.13	.17*	.07	.22**	.27*
DR	.40***	.08	-.02	-.17+	.08	-.11
TR	.24***	-.03	-.05	-.08	.08	.06
AEQ	-	-	.25**	.19+	.09	-.01

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Note: AEQ: Ambivalence about Expressing emotion Questionnaire;
ER: External Regulation; JR: Introjected Regulation; DR: Identified Regulation; TR: Integrated Regulation

Table 5. Means, SD's, and Alphas of SRWNE Subscales (Study 2 and Study 3)

	Study 2						Study 3		
	Time 1			Time 2					
	Mean	SD	α	Mean	SD	α	Mean	SD	α
External Regulation	3.55	1.21	.79	3.48	1.27	.83	4.83	1.40	.79
Introjected Regulation	3.30	1.20	.83	3.24	1.21	.85	4.86	1.12	.71
Identified Regulation	4.48	1.03	.77	4.55	.99	.76	5.96	1.05	.68
Integrated Regulation	4.38	1.29	.76	4.38	1.30	.80	4.33	1.44	.70
Controlled Index	.00	1.87	.89	.00	1.87	.90	.00	1.84	.85
Autonomous Index	.00	1.79	.84	.00	1.79	.85	.00	1.73	.78
Relative Autonomy Index	.00	1.81	.91	.00	1.77	.92	.00	1.83	.87

Table 6. Regression Analyses for Comparing the SRWNE with Coping Modes and General Health Measures (Study 2)

	Expression (R^2= .09)		Active Coping (R^2= .13)		Positive Int (R^2= .11)		Repairing (R^2= .11)	
	zero-order r	beta	zero-order r	beta	zero-order r	beta	zero-order r	beta
ER	-.17**	.11	-.19***	-.15+	-.21***	-.28***	-.26***	-.33***
JR	-.29***	-.35***	-.19***	-.22*	-.13*	-.05	-.17**	-.07
DR	-.18***	.01	.05	.09	.07	.10	.06	.15+
TR	-.13*	-.05	.21***	.27***	.18***	.22***	.15*	.17*

	GHQ (R^2= .20)		Anxiety (R^2= .15)		Depression (R^2= .18)		Dysfunctional (R^2= .10)		Somatization (R^2= .18)	
	zero-order r	beta	zero-order r	beta	zero-order r	beta	zero-order r	beta	zero-order r	beta
ER	-.34***	-.19*	.29***	.21*	.31***	.21*	.22***	.10	.17**	.04
JR	-.29***	-.21*	.23***	.14	.24***	.07	.20***	.15	.18**	.25**
DR	-.08	.10	.05	-.14+	.09	-.03	.05	-.05	.04	-.06
TR	.00	.03	.04	.05	.01	-.03	-.03	-.02	-.04	-.09
Expression	-.01	-.10+	.03	.09	-.07	.00	-.01	.09	.08	.11+
Active coping	.12*	-.04	-.08	.04	-.14*	.04	-.20***	-.11	.02	.11
Positive Int	.17**	-.06	-.12*	.08	-.19***	.06	-.19***	-.05	-.03	.05
Repairing	.33***	.30***	-.27***	-.28***	-.35***	-.33***	-.21***	-.08	-.13*	-.15*

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Note: Expression: Expressing emotion; Positive Int: Positive Interpretation; Repairing: Repairing emotion; ER: External Regulation; JR: Introjected Regulation; DR: Identified Regulation; TR: Integrated Regulation; GHQ: General Health Questionnaire composite; Dysfunctional: Social Dysfunction;

Table 7. Unstandardized Estimates of Construct Means and Standard Deviations for the SRWNE Subscales and Correlations among the Subscales

Group	ER	JR	DR	TR
Means				
Korean Men	0	0	0	0
Korean Women	-.04	.20	-.04	-.05
US Men	-1.24***	-1.37***	-1.10***	-.11
US Women	-1.26***	-1.56***	-1.18***	-.14
Standard Deviations				
Korean Men	1	1	1	1
Korean Women	1.20	1.05	.93	1.16
US Men	.84	.93	.91	.78
US Women	.98	1.03	.98	.83

Correlations

		Korean Women					US Women			
		ER	JR	DR	TR		ER	JR	DR	TR
Korean Men	ER	-	.99	.55	.45	US Men	-	.93	.64	.41
	JR	.97	-	.42	.43		1.13	-	.74	.49
	DR	.51	.65	-	.63		.56	.68	-	.71
	TR	.61	.75	.83	-		.50	.41	.84	-

*** $p < .001$

Note. The group of Korean men was a reference group of mean equal 0 and SD equal 1;
All SD's were significantly different from the reference group at $p < .001$;
ER = External Regulation; JR = Introjected Regulation;
DR = Identified Regulation; TR = Integrated Regulation

Spirituality Moderates the Effect of Stress on Emotional and Physical Adjustment

Youngmee Kim and Larry Seidlitz

University of Rochester School of Medicine

Running Head: Spirituality and coping

Correspondence to: Youngmee Kim

Cancer Prevention and Control

Mount Sinai School of Medicine

One Gustave Levy Place, Box 1130

New York, NY 10029-6574

(212) 659-5646 (office)

(212) 849-2564 (fax)

Youngmee.kim@mssm.edu

Abstract

This study examined the relationship of spirituality with emotional and physical adjustment to daily stress. One hundred thirteen college students completed questionnaire measures of spirituality, daily stress, affect, and physical symptoms at two times one month apart. The results showed that spirituality buffered the adverse effect of stress on adjustment, controlling for the use of general coping strategies. The findings have implications for developing prevention programs to improve people's coping skills by incorporating greater emphasis on spirituality.

Key Words: spirituality, stress-buffering effect, emotional and physical adjustment

Spirituality Moderates the Effect of Stress on Emotional and Physical Adjustment

The notion that religiousness or spirituality has beneficial health consequences has been supported by numerous empirical studies (see reviews by Joseph, 1998; Pargament, 1997). "Religiousness" and "spirituality" may be defined as overlapping concepts that involve "the subjective feelings, thoughts, and behaviors that arise from a search for the sacred" (Larson, Swyer, & McCullough, 1998, p. 22). They differ, however, in that religiousness also implies association with an identifiable group. Previous studies have focused on relations of religiousness with health, but due to the conceptual overlap between religiousness and spirituality, these studies also bear on the relation of spirituality with health.

Matthews, Larson, and Barry (1994), for example, reviewed research showing that religious factors were associated with lower substance use and negative affect, and with improved quality of life, life satisfaction, marital satisfaction, altruism, and self-esteem. In addition, religious factors were related to reduced blood pressure, improved general health, and longer life. However, not all studies supported the adaptive function of religiousness. For example, family members waiting for a relative undergoing coronary artery bypass surgery reported higher levels of depression and anxiety when they used religious coping strategies to adjust to the stress (Pargament et al., 1999). In diverse samples coping with assorted life stressors (i.e., people coping with the Oklahoma City bombing, college students coping with major life stressors, elderly hospitalized patients coping with serious medical illness, and church members coping with major life stressors), Pargament and colleagues identified positive and negative patterns of religious coping methods and found that the negative patterns (e.g., appraisals involving a punishing God, deferring to God's will) were associated with higher levels of distress and

psychosomatic symptoms (Pargament, Smith, Koenig, & Perez, 1998; Pargament, Zinnbauer et al., 1998).

Although empirical studies consistently indicate that religiousness is commonly used in times of stress, they are inconsistent in showing its effectiveness. The discrepancy in the findings may result from using insensitive measures of religiosity, relying on cross-sectional designs, or failing to incorporate cultural diversity in measures and designs (Hathaway & Pargament, 1991; Thoresen, 1999). It is also possible that the effectiveness of religiousness in coping depends on the level of stress experienced. Indeed, religiousness has been found to moderate the effect of stress on adjustment. Park and colleagues (Park, Cohen, & Herb, 1990) found that intrinsic religiousness moderated the effect of stress on depression for Protestant college students, although this moderating effect was not found for Catholics. This finding has been replicated with community adults (Hettler & Cohen, 1998) and patients and their significant others coping with kidney transplant surgery (Tix & Frazier, 1998).

The existing findings about religiousness suggest that the overlapping construct of spirituality may be a significant factor in mental and physical health, but it is still unclear how it is related to coping, and whether it influences health regardless of stressful circumstances or by moderating the effects of stress. We theorize that spirituality may buffer the effects of stress on health through its influence on four domains: cognition, emotion, behavior, and transcendence (Seidlitz et al., 2000). Spiritual beliefs may boost self-esteem (Maltby, Lewis, & Day, 1999), or provide constructive attributional perspectives that help a person find his/her sense of meaning and purpose, thereby limiting mental health consequences of adverse life experiences (Clark, Friedman, & Martin, 1999; Koenig, Hays et al., 1997; Spilka, Shaver, & Kirkpatrick, 1985). Spiritual involvement may reduce negative affect and increase feelings of security and comfort

through fulfilled innate needs for relatedness (Cobb, 1976; House, Landis, & Umberson, 1988; Kobasa, Maddi, Puccetti, & Zola, 1984; Sarason, Sarason, Potter, & Antoni, 1985; Wallston, Alagra, DeVellis, & DeVellis, 1983). Spiritual practices may limit the harmful effects of stress by developing supportive social networks and promoting health behaviors (Koenig et al. 1997; Maltby et al., 1999; Waite, Hawks, & Gast, 1999). Finally, coping may be facilitated by the experience of transcending one's psychological distress or physical suffering, giving a sense of secondary control over the situation (Pargament et al., 1999; Seidlitz et al., 2000). These components of spirituality may contribute to mental or physical health above and beyond the effects of nonreligious coping strategies (Pargament, 1997; Pargement et al., 1999).

Previous studies have tended to focus on the effects of religiousness on adjustment in major stress situations such as illness (e.g., Koenig et al., 1995; Oxman, Freeman, & Manheimer, 1995; Pargament, Smith et al., 1998; Tix & Frazier, 1998), victimization (Thompson & Vardaman, 1997), war (Pargament et al., 1994), and the death of a loved one (e.g., Hettler & Cohen, 1998; McIntosh, Silver, & Wortman, 1993; Park & Cohen, 1993). Spirituality, however, is a part of the everyday lives of most individuals (Pargament, 1997) and may also affect adjustment to minor daily life events. Because of the frequency of daily hassles, they may have a significant impact on health, even though they are less serious than major stressors (Bolger, DeLongis, Kessler, & Schilling, 1989; Eckenrode, 1984). Indeed, daily stressors often have been found to be significant correlates of physical symptoms (Cohen, Burt, & Bjork, 1987; Eckenrode, 1984; Holahan & Moos, 1991; O'Leary, 1990; Salovey, O'Leary, Stretton, Fishkin, & Drake, 1991). Therefore, the study of the role of spirituality in adjusting to daily stressors may have implications for health.

Whereas most studies on the impact of religiousness on adjustment have focused on elderly populations, several have examined its effects in college students. Some studies have

found that religiosity in college students was positively associated with high self-esteem and problem-focused coping (Knox, Langehough, Walters, & Rowley, 1998; Maltby & Day, 1999; Maton, 1989) and negatively associated with depression, avoidance coping, substance use, or engaging in risky sexual behavior (Maltby & Day, 1999; Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998). However, other studies have found that religious coping was maladaptive (Pargament, Zinnbauer et al., 1998; Schafer, 1997) or unrelated to mental health (Bergin, Stinchfield, Gaskin, Masters, & Sullivan, 1988) or stress (Schafer & King, 1990). Therefore, the effect of spirituality on adjustment in college students remains unclear.

The purposes of the present study were (1) to determine whether spirituality is related to better emotional and physical adjustment in college students, (2a) to examine whether spirituality buffers the effects of stress on emotional and physical adjustment over time, (2b) if spirituality buffers the adverse effects of stress, to examine whether these effects are the same regardless of affiliation with a religious group, and (3) to test the relative contributions of spirituality versus general coping strategies to emotional and physical adjustment.

Method

Participants

University students in Seoul, Korea taking an introductory Psychology course (N = 135 at Time 1, N = 161 four weeks later at Time 2) completed questionnaires for class extra credit. One hundred thirteen students (73 men and 40 women) who completed the questionnaires at both times were included in the analyses. The median age was 20 years (ranged 19 to 33). Religious affiliation was distributed as follows: Buddhist (5%), Catholic (13%), Protestant (31%), other (3%), and no religious preference (48%). Participants were categorized into two groups based on whether or not they were religiously affiliated. The questionnaires were presented in participants'

native language, with scales translated into Korean by the first author, back-translated by a bilingual person, and then checked by the second author.

Measures

Spirituality. The 8-item Spiritual Transcendence Index (STI; Seidlitz et al., 2000) was used to assess individual differences in spirituality at Time 1 only. The STI refers to a subjective experience of the sacred that affects one's self-perception, feelings, goals, and ability to transcend difficulties. To accommodate different conceptualizations of spirituality, it refers specifically to "God" in one subset of four items and to "spirituality" or "spiritual" in another subset of four items. Participants rated the items on a 6-point Likert scale (1 = extremely disagree and 6 = extremely agree). The STI score is based on the average rating of the eight items, higher scores indicating higher spirituality.

General Coping. The 28-item COPE-S (Carver, 1997) was used to measure individual differences in various coping styles at Time 1 only. It included items measuring various strategies, such as self-distraction, active coping, denial, substance use, use of emotional or instrumental support, disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. Participants rated the items on a 4-point Likert scale (1 = I usually don't do this at all and 4 = I usually do this a lot). In an attempt to avoid conceptual overlap with the spirituality, as measured by the STI, two items measuring religious coping were excluded from a composite general coping index that was created by averaging the other items.

Stress. The 58-item College Student's Daily Events Scale (Won, Lee, & Kim, 1989) was used to assess the level of stress that participants experienced in their daily life at both Times 1 and 2. The scale was developed with Korean college students and found to be reliable and valid (Won et al., 1989). The items were rated on an 8-point Likert scale (0 = not at all stressful and 7 = extremely stressful). The average of the 58 items was used to indicate the level of daily stress.

Emotional Adjustment. The 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), consisting of 10 positive and 10 negative affect adjectives, was used to assess the degree of individuals' emotional adjustment at both Times 1 and 2. Participants rated the items on a 5-point Likert scale (1 = not at all and 5 = extremely). Positive and negative affect scores were based on the average rating of the ten adjectives comprising each scale. Higher scores on positive affect and lower scores on negative score indicate better emotional adjustment.

Physical Adjustment. The 36-item Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983) measured physical symptoms that participants experienced during the past month, exclusive of psychological symptoms (e.g., depression), at both Times 1 and 2. Participants rated the items on a 5-point Likert scale (1 = not at all and 5 = extremely). The average rating of the 36 items was used to measure physical adjustment, higher scores indicating poorer physical adjustment.

Results

Means, SD's, and alphas of the study variables are shown in Table 1. All scales were reliable (αs > .81).

Insert Table 1 about here

In order to examine the three research questions, Pearson correlations and a series of hierarchical regression analyses were performed. The hierarchical regressions examined effects on each of three dependent variables: positive affect, negative affect, and physical symptoms. In each regression, the initial score (Time 1) of the dependent variable was controlled for in step 1

and the initial score (Time 1) of stress level was controlled for in step 2. The four main effect variables -- spirituality, general coping, stress at Time 2, and religious affiliation (1 for religiously affiliated and –1 for not religiously affiliated) -- were entered in step 3. Thus, the main effect of stress at Time 2 indicates the unique contribution of stress to changes in the dependent variable over time, adjusting for initial stress (Cohen & Cohen, 1983). Two-way interaction terms between stress at Time 2 and spirituality, and stress at Time 2 and the general coping score were entered in step 4. A three-way interaction term among stress at Time 2, spirituality, and religious affiliation was entered in step 5. To reduce multicollinearity, predictor variables were centered on their sample means prior to the calculation of interaction terms (Aiken & West, 1991).

In figures provided to help interpret significant interaction effects, values for the dependent variable were calculated based on scores of the predictor variables that were one standard deviation above and one standard deviation below the means of the relevant predictor variables (Cohen & Cohen, 1983). These estimates were then used to calculate slopes for the dependent variable relevant to each predictor variable.

Is Spirituality Related to Better Emotional and Physical Adjustment?

The Pearson correlations reported in Table 2 revealed that the spirituality was not associated with stress, or with emotional or physical adjustment at either Time 1 or Time 2. In the series of hierarchical regressions reported in Table 3, the main effect for the spirituality (step 3), controlling for use of general coping strategies and changes in stress, was not significant for changes in positive affect, negative affect, or physical symptoms. These results suggest that spirituality *per se* may not be directly related to emotional and physical adjustment.

Insert Tables 2 and 3 about here

Does Spirituality Moderate the Impact of Stress on Adjustment?

The hypothesized stress-moderating effects of spirituality on emotional and physical adjustment are also shown in Table 3. The stress x spirituality interaction effect (step 4) was significant on changes in both negative affect and physical symptom reports, but not on change in positive affect. As shown in Figures 1 and 2, the positive relations between stress and both negative affect (Figure 1) and physical symptom reports (Figure 2) were weaker at higher levels of spirituality. These results suggest that spirituality buffered the effect of stress on negative affect and physical adjustment.

Insert Figures 1 and 2 about here

Next, we examined whether the stress moderating effects of spirituality were contingent on whether the participants were religiously affiliated. The three-way interactions in step 5 in Table 3 were not significant. The result suggests that spirituality buffered the effect of stress on negative affect and physical adjustment, regardless of whether the participants were affiliated with a religious group.

Does Spirituality Influence the Adjustment Above and Beyond General Coping?

The use of general coping strategies was positively correlated with stress, positive affect, and negative affect at both measurement times, and with physical symptom reports at Time 2 (see Table 2). However, the main effects for general coping on these variables were non-significant in the hierarchical regressions when adjusted for the baseline levels of the dependent variables and stress, and the concurrent levels of stress and spirituality. Neither did the use of general coping

strategies moderate the associations of stress with the dependent variables (see Table 3). In contrast, the stress-buffering effects of spirituality on negative affect and physical adjustment were independent of the use of general coping strategies.

Discussion

The purposes of the study were to examine whether spirituality either had direct effects, or moderated the effects of stress, on emotional or physical adjustment in college students. The findings illustrated that spirituality buffered the adverse effects of stress on negative affect and physical adjustment. Spirituality was not directly related to stress, however, nor did it independently reduce negative affect or physical symptoms, or increase positive affect, findings which are consistent with previous studies (e.g., Bergin et al., 1988; Schafer & King, 1990). Instead, spirituality was related to these adjustment indicators only in interaction with changes in stress.

The findings of the stress-buffering effects of spirituality on negative affect and physical symptoms are consistent with previous studies on college students (Maton, 1989; Park et al, 1990) as well as on elderly populations (Hettler & Cohen, 1998; Kendler et al., 1997; Tix & Frazier, 1998; Williams et al., 1991). While a stress-buffering effect of spirituality was found for Protestants, but not for Catholics, in the previous studies (e.g., Park et al., 1990: Hettler & Cohen, 1998: Tix & Frazier, 1998), in the present study, spirituality moderated the effects of stress regardless of religious affiliation. About half of participants in the present study indicated they did not have a religious affiliation. Thus, the findings in the present study were not limited to religious individuals, and suggest the possible usefulness of spirituality in coping in nonreligious populations. In addition, the present findings extended previous studies that focused on major stressors, showing that spirituality buffered the adverse effects of daily stressors.

As suggested by Seidlitz and colleagues (2000) and Hathaway and Pargament (1991), spirituality may be an important resource in transcending or ameliorating stressors, regardless of individuals' association with an identifiable religious group. The STI was specifically developed to omit reference to religion and to accommodate different conceptualizations of spirituality. The finding that spirituality, as measured by the STI, buffered the effects of stress in this Asian student sample, many of whom had no religious affiliation, indicates the importance of distinguishing spirituality from religiousness and the validity of the instrument.

The STI conceives of spirituality as conferring four types of subjective benefits - cognitive, affective, motivational, and transcending. While these four influences or aspects of spirituality are reflected in the content of the STI, they are not independently measured and their specific effects in buffering stress require further study. The STI measures a perception of spiritual purpose and God's presence in one's life. We speculate that such perceptions may assist in coping with stressors by providing a broad positive perspective of one's life within which to understand and withstand difficulties that may arise. Spiritual people may be less distracted by problems or be less likely to overemphasize them, instead viewing difficulties as meaningful or even useful episodes in the larger context of life. Spiritual people as measured by the STI tend to experience feelings of fulfillment and deep communion with God. It is possible that these positive emotional experiences abide through the vicissitudes of life and provide inner strength and solace that guard against and help dispel feelings of anxiety or despair. The STI also measures the individual's perceived commitment to God and spirituality. The motivation towards spiritual experience and growth may provide a focus and direction to the person's life that is unshaken by difficulties or annoyances. While everyday problems may adversely affect other

goals, the goal of maintaining and developing one's spirituality may be less subject to external disturbances, providing a continuous and fulfilling objective and direction to the person's life.

Finally, the STI measures the perception that the person's spirituality helps to transcend problems and maintain a sense of inner peace in spite of them. The fact that those scoring higher on the measure were less likely to report experiencing negative affect or physical symptoms in the face of higher stress is evidence that this transcending influence of spirituality was operative and valid. Future work is needed that examines whether each of these specific aspects of spirituality are involved in reducing the adverse effects of stress.

The stress-buffering effect was found only for spirituality but not for general coping strategies. This finding supports Pargament's (1997) conclusion that religious coping accounts for unique variance in mental or physical health independent of the effects of nonreligious coping, and is consistent with previous empirical studies (e.g., Pargament et al., 1999). It suggests that boosting spirituality may be one way to help students adjust to daily stress.

While the stress-buffering effect of spirituality was found on negative affect and physical adjustment, it was not found on positive affect. Consistent with findings that negative affect and positive affect are independent of each other (e.g., Watson et al., 1988), spirituality had different effects on these two types of affect. The effect of spirituality on positive affect has been understudied in previous research, thus, the lack of relation found in the present study should be replicated in future studies before firm conclusions are drawn. In addition, coping with different types of stressors may influence positive affect in different ways. For example, when individuals visualized their controllable stressful events and the emotions they had experienced, or visualized having resolved the problem, they reported more positive affect (Rivkin & Taylor, 1999).

In the present study, spirituality ameliorated the effects of perceived daily stress on self-reported negative affect and physical symptoms in Korean college students. Future studies should attempt to replicate the current findings with people in other cultures, over a longer time-frame, and using objective physical health measures. It may also be useful to assess specific adjustment indicators that are more critical for specific subgroups (e.g., drug abuse for adolescents; post-parturm depression for women who recently delivered babies). The findings have implications for promoting prevention programs that incorporate greater emphasis on spirituality as a way to improve people's coping skills.

References

Aiken, L. S., & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. New York: Sage Publications, Inc.

Barbarin, O. A., Chesler, M. A. (1986). The medical context of parental coping with childhood cancer. American Journal of Community Psychology, 14, 221-235.

Bergin, A. E., Stinchfield, R. A., Gaskin, T. A., Masters, K. V., & Sullivan, C. E. (1988). Religious life-styles and mental health: An exploratory study. Journal of Counseling Psychology, 34, 91-98.

Bolger, N., & DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. Journal of Personality and Social Psychology, 57, 808-818.

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. International Journal of Behavioral Medicine, 4, 92-100.

Clark, K. M., Friedman, H. S., & Martin, L. R. (1999). A longitudinal study of religiosity and mortality risk. Journal of Health Psychology, 4, 381-391.

Cobb, S. (1976). Social support as a moderator of life stress. Psychosomatic Medicine, 38, 300-314.

Cohen, J., & Cohen, P. (1983). Applied Multiple Regression/Correlation Analysis for theBehavioral Sciences. Hillsdale, NJ: Erlbaum.

Cohen, S. Burt, C. E., & Bjork, J. P. (1987). Life stress and adjustment: Effects of life events experienced by young adolescents and their families. Developmental Psychology, 23, 583-592.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. Journal of Applied Social Psychology, 13, 99-125.

Eckenrode, J. (1984). Impact of chronic and acute stressors on daily reports of mood. Journal of Personality and Social Psychology, 46, 907-918.

Hathaway, W. L., & Pargament, K. I. (1991). The religious dimensions of coping: Implications for prevention and promotion. Prevention in Human Services, 9, 65-92.

Hettler, T. R., & Cohen, L. H. (1998). Intrinsic religiousness as a stress-moderator for adult Protestant churchgoers. Journal of Community Psychology, 26, 597-609.

Holahan, C. J., & Moos, R. H. (1991). Life stressors, personal and social resources, and depression: A 4-year structural model. Journal of Abnormal Psychology, 100, 31-38.

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. Science, 241, 540-545.

Joseph, M. (1998). The effect of strong religious beliefs on coping with stress. Stress Medicine, 14, 219-224.

Kendler, K. S., Gardner, C. O., Prescott, C. A. (1997). Religion, psychopathology, and substance use and abuse: A multimeasure, genetic-epidemiologic study. American Journal of Psychiatry, 154, 322-329.

Knox, D., Langehough, S, O., Walters, C., & Rowley, M. (1998). Religiosity and spirituality among college students. College Student Journal, 32, 430-432.

Kobasa, S. C. O., Maddi, S. R., Puccetti, M. T., & Zola, M. A. (1984). Effectiveness of hardiness, exercise & social support as resources against illness. Journal of Psychosomatic Research, 29, 525-535.

Koenig, H. G., Cohen, J. J., Blazer, D. G., Kudler, H. S., Krishnan, K. R., & Sibert, T. E. (1995). Religious coping and cognitive symptoms of depression in elderly medical patients. Psychosomatics, 36, 369-375.

Koenig, H. G., Hays, J. C., George, L. K., Blazer, D. G., Larson, D. B., & Landerman, L. R. (1997). Modeling the cross-sectional relationships between religion, physical health, social support, and depressive symptoms. American Journal of Geriatric Psychiatry, 5, 131-144.

Koenig, H. G., Parkerson, Jr., G. R., Meador, K. G. (1997). Religion Index for psychiatric research: A 5-item measure for use in health outcome studies. American Journal of Psychiatry, 154, 885-886.

Larson, D. B., Swyers, J. P., & McCullough, M. E. (1998). Scientific research on spirituality and health: A consensus report. Bethesda, MD: National Institute for Healthcare Research.

Maltby, J., & Day, L. (1999). Sex role identity, attitudes toward the opposite sex and same sex, and defense style. Journal of Genetic Psychology, 160, 381-383.

Maltby, J., Lewis, C.A., & Day, L. (1999). Religious orientation and psychological well-being: The role of the frequency of personal prayer. British Journal of Health Psychology, 4, 363-378.

Maton, K. I. (1989). The stress-buffering role of spiritual support: Cross-sectional and prospective investigations. Journal for the Scientific Study of Religion, 28, 310-323.

Matthews, D. A., Larson, D. B., & Barry, C. P. (1994). The faith factor: An annotated bibliography of clinical research on spiritual subjects. National Institute for Health Care Research (Vol. 1), Rockville, MD; John Templeton Foundation.

McIntosh, D. N., Silver, R. C., & Wortman, C. B. (1993). Religion's role in adjustment to a negative life event: Coping with the loss of a child. Journal of Personality and Social Psychology, 65, 812-821.

O'Leary, A. (1990). Stress, emotion, and human immune function. Psychological Bulletin, 108, 363-382.

Oxman, T. E., Freeman, D. H., & Manheimer, E. D. (1995). Lack of social participation or religious strength and comfort as risk factors for death after cardiac surgery for the elderly. Psychosomatic Medicine, 57, 5-15.

Pargament, K. I. (1997). The psychology of religion and coping. New York: Guilford.

Pargament, K. I., Cole, B., Vandecreek, L., Belavich, T., Brant, C., & Perez, L. (1999). The vigil: Religion and the search for control in the hospital waiting room. Journal of Health Psychology, 4, 327-341.

Pargament, K. I., Ishler, K., Dubow, E., Stanik, P., Rouiller, R., Crowe, P., Cullman, E., Albert, M., & Royster, B. (1994). Methods of religious coping with the Gulf War: Cross-sectional and longitudinal analyses. Journal for the Scientific Study of Religion, 33, 347-361.

Pargament, K .I., Smith, B. W., Koenig, H. G., & Perez, L. (1998). Patterns of positive and negative religious coping with major life stressors. Journal for the Scientific Study of Religion, 37, 710-724.

Pargament, K. I., Zinnbauer, B. J., Scott, A. B., Butter, E. M., Zerowin, J., & Stanik, P. (1998). Red flags and religious coping: Identifying some religious warning signs among people in crisis. Journal of Clinical Psychology, 54, 77-89.

Park, C., & Cohen, L. H. (1993). Religious and nonreligious coping with the death of a friend. Cognitive Therapy and Research, 17, 561-577.

Poulson, R. L., Eppler, M. A., Satterwhite, T. N., Wuensch, K. L., & Bass, L. A. (1998). Alcohol consumption, strength of religious beliefs and risky sexual behavior in college students. Journal of American College Health, 46, 227-232.

Rivkin, I. D., & Taylor, S. E. (1999). The effects of mental simulation on coping with controllable stressful events. Personality and Social Psychology Bulletin, 25, 1451-1462.

Salovey, P., O'Leary, A., Stretton, M. S., Fishkin, S. A., & Drake, C. A. (1991). Influence of mood on judgments about health and illness. In J. Forgas (Ed.), Emotion and social judgments (pp. 241-262). Oxford, England: Pergamon Press, Inc.

Sarason, I. G., Sarason, B. R., Potter, E. H., & Antoni, M. H. (1985). Life events, social support, & illness. Psychosomatic Medicine, 47, 156-163.

Schafer, W. E. (1997). Religiosity, spirituality, and personal distress among college students. Journal of College Student Development, 38, 633-644.

Schafer, W. E., & King, M. (1990). Religiousness and stress among college students: A survey report. Journal of College Student Development, 31, 336-341.

Seidlitz, L., Abernethy, A. D., Duberstein, P. R.., Evinger, J. S., Chang, T. H., & Lewis, B. (2000). Development of the Spiritual Transcendence Index. Manuscript submitted for publication.

Spilka, B., Shaver, P., & Kirkpatrick, L. A. (1985). A general attribution theory for the psychology of religion. Journal for the Scientific Study of Religion, 24, 1-20.

Thompson, M. P., & Vardaman, P. J. (1997). The role of religion in coping with loss of a family member to homicide. Journal for the Scientific Study of Religion, 36, 44-51.

Thoresen, C. E. (1999). Spirituality and health: Is there a relationship? Journal of Health Psychology, 4, 291-300.

Tix, A., & Frazier, P. (1998). The use of religious coping during stressful life events: Main effects, moderation, and mediation. Journal of Consulting and Clinical Psychology, 66, 411-422.

Waite, P.J., Hawks, S. R., & Gast, J. A. (1999). The correlation between spiritual well-being and health behaviors. American Journal of Health Promotion, 13, 159-162.

Wallston, B. S., Alagra, S. W., DeVellis, B. M., & DeVellis, R. F. (1983). Social support and physical health. Health Psychology, 2, 367-391.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology, 54, 1063-1070.

Williams, R. C., Larson, D. B., Buckler, R., Heckman, R., & Pyle, C. (1991). Religion and psychological distress in a community sample. Social Science and Medicine, 32, 1257-1262.

Won, H. T., Lee, M. S., & Kim, S. J. (1989). A survey on the stress situations of the Seoul National University students. Student Review, 24, 80-92.

Author Note

Youngmee Kim, Behavioral Medicine, and Larry Seidlitz, Department of Psychiatry, University of Rochester School of Medicine.

We thank Taeyun Jung, Sangsun Lee, and Suae Park for help with collection of the data in Korea and Paul Duberstein, James Evinger, Youja Ro for their helpful comments on an early draft of the article.

Correspondence concerning this article should be addressed to Youngmee Kim, Behavioral Medicine, University of Rochester School of Medicine, 601 Elmwood Ave., Box 704, Rochester, NY 14642. Electronic mail may be sent to youngmee_kim@urmc.rochester.edu.

Table 1. Means, SD's, and Alphas of Study Variables

	Time 1			Time 2		
	Mean	SD	α	Mean	SD	α
STI	3.08	1.32	.96			
COPE	2.39	.35	.75			
Stress	1.97	.86	.94	2.04	1.03	.96
Positive Affect	2.64	.64	.81	2.66	.67	.82
Negative Affect	2.38	.61	.81	2.42	.69	.84
Physical Symptoms	.85	.49	.91	.93	.59	.93

Note: STI = Spiritual Transcendence Index; COPE = use of general coping strategies

Table 2. Correlation Coefficients among Study Variables

	1	2	3	4	5	6	7	8	9
1. STI	-								
2. COPE	-.06	-							
3. Stress_T1	.02	.22*	-						
4. Stress_T2	.06	.20*	.69***	-					
5. PA_T1	.09	.17+	.00	.07	-				
6. PA_T2	.01	.24**	.11	.19*	.49***	-			
7. NA_T1	-.03	.23*	.27**	.25**	.24**	-.01	-		
8. NA_T2	-.08	.19*	.40***	.46***	.10	.34***	.44***	-	
9. Symptom_T1	-.08	.15	.32***	.33***	.03	-.12	.39***	.24**	-
10. Symptom_T2	-.08	.16+	.38***	.46***	.11	-.01	.36***	.45***	.65***

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Note: STI = Spiritual Transcendence Index; COPE = use of general coping strategies;
T1 = Time 1; T2 = Time2
PA = Positive Affect; NA = Negative Affect; Symptom = Physical symptom

Table 3. Hierarchical Regression Analyses on Adjustment Outcomes

	PA_T2		NA_T2		Symptoms_T2	
	β	$R^2\Delta$	β	$R^2\Delta$	β	$R^2\Delta$
Step 1:						
Baseline DV at Time 1	.50***	.25***	.44***	.19***	.65***	.42***
Step 2:						
Stress_T1	.11	.01	.30***	.09***	.21**	.04**
Step 3:						
Stress_T2	.15	.04	.36**	.08*	.28**	.04
STI	-.11		-.20		-.01	
COPE	.15		.03		.02	
Religiously Affiliated (RA)	.12		.17		-.04	
Step 4:						
Stress_T2 x STI	-.02	.03	-.35*	.09**	-.20*	.03
Stress_T2 x COPE	-.03		-.05		-.04	
Step 5:						
RA x Stress_T2 x STI	-.18	.02	-.18	.02	-.05	.00

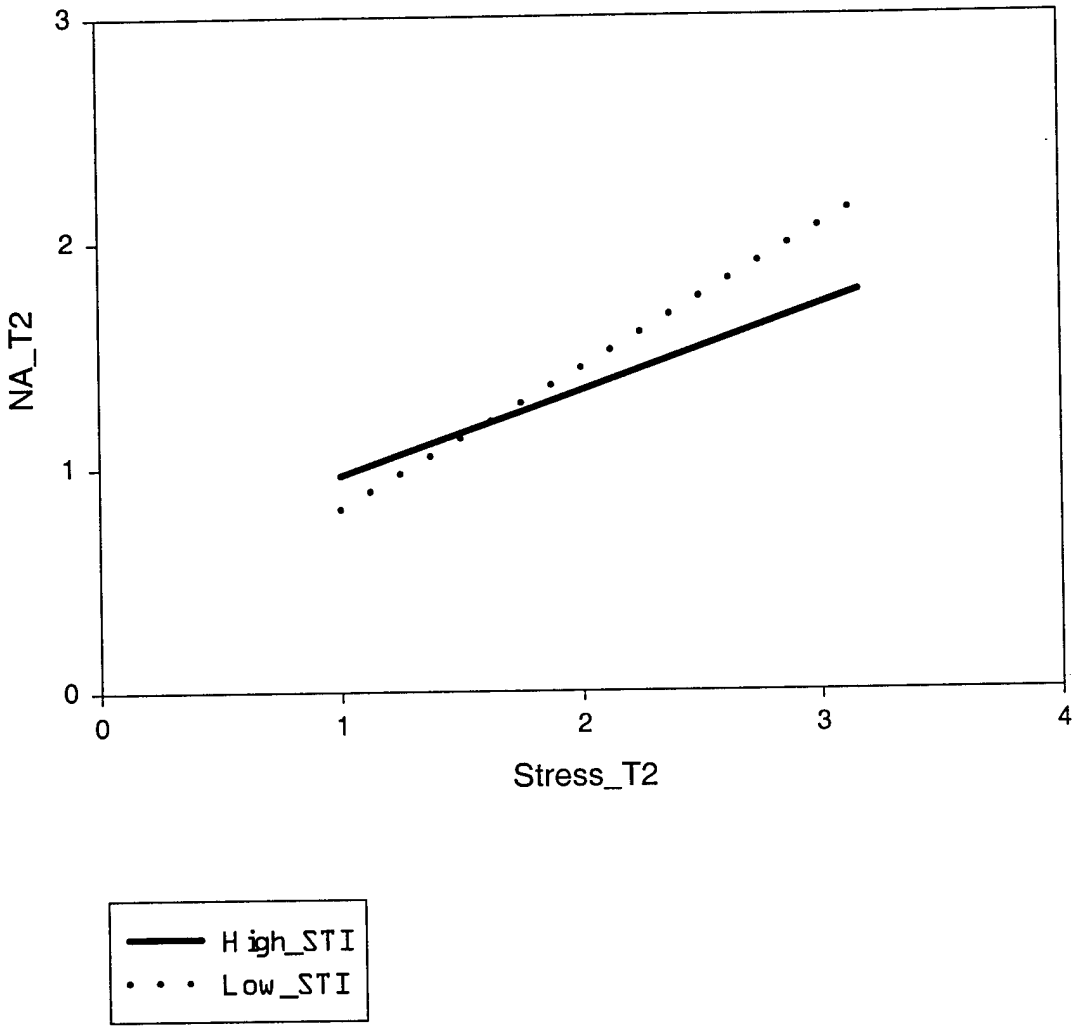
+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

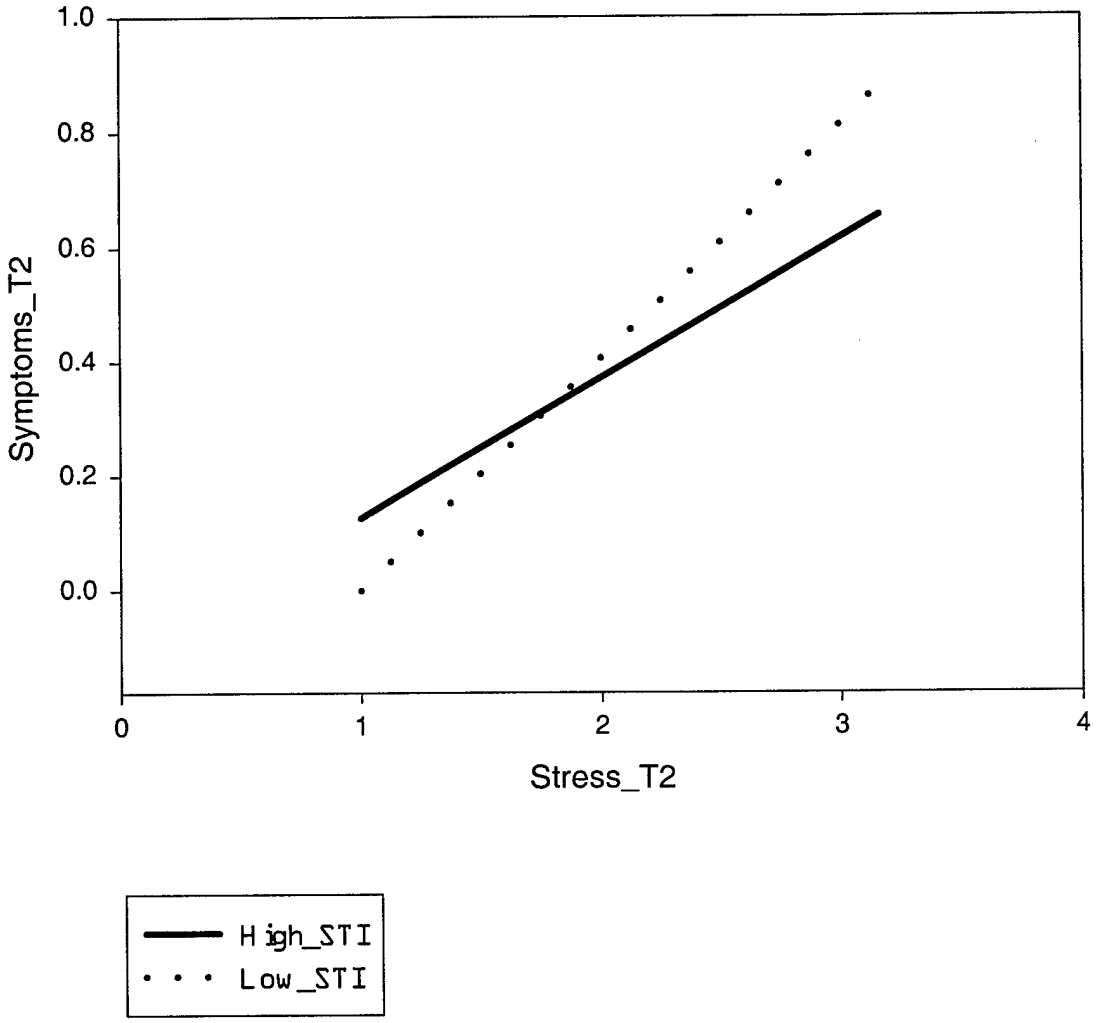
Note: T1 = Time1; T2 = Time2
STI = Spiritual Transcendence Index; COPE = use of general coping strategies;
RA = 1 for religiously affiliated, -1 for not religiously affiliated;
PA = Positive Affect; NA = Negative Affect; Symptom = Physical symptom

Figure Captions

Figure 1. STI's stress-buffering effect on Negative Affect

Figure 2. STI's stress-buffering effect on Physical Symptom Reports


3
2
1
0
NA_T2
0
1
2
3
4
Stress_T2
High_STI
Low_STI


1.0
0.8
0.6
0.4
0.2
0.0
Symptoms_T2
0
1
2
3
4
Stress_T2
High_STI
Low_STI

Depression in Spouses of People with Lung Cancer: Personality, Social Support, and Caregiving Burden

Youngmee Kim[1], Paul R. Duberstein[2], Silvia Sorensen[2], and Kenneth R. Conner[2]

[1]Mount Sinai School of Medicine

[2]University of Rochester School of Medicine

Running Head: Caregiver Depression

Correspondence to:

Youngmee Kim
Cancer Prevention and Control
Mount Sinai School of Medicine
One Gustave Levy Place, Box 1130
New York, NY 10029-6574
(212) 659-5646 (office)
(212) 849-2564 (fax)
youngmee.kim@mssm.edu

Personality traits predict the onset, recurrence, and exacerbation of depression in community dwellers, but little is known about personality and depression in other contexts. We used structural equation modeling to address this issue in a study of 117 spouses of lung cancer patients. We examined (a) the direct relation between personality and depression and (b) the indirect relation through the hypothesized mediators of social support and caregiver burden. Results showed that the direct path from the vulnerable personality (high in neuroticism and low in both extraversion and self-efficacy) to depression was significant when the hypothesized mediators were excluded from the model. The overall model remained significant when the mediators were included. The link between vulnerable personality and depression was mediated by caregiving burden or both social support and caregiving burden, not by only social support. The vulnerable personality was positively associated with caregiving, which, in turn, increased depression. The relation between social support and depression was mediated by caregiver burden. Lower levels of social support were associated with increased burden, which, in turn, increased depression. These findings are generally consistent with the literature on depression in community samples and suggest that it may be possible to identify at-risk caregivers long before the burden sets in and spousal caregivers at risk for depression may benefit from programs that can help allay the strains associated with the caregiving role.

Key Words: caregiver depression, personality, social support, caregiving burden

Depression in Spouses of People with Lung Cancer: Personality, Social Support, and Caregiving Burden

Caregivers are at increased risk for poor mental health, when compared to population norms or control groups (e.g., Schulz et al. 1997; Williamson et al., 1998), although there is a wide variability: some respond well to the task, whereas others do not. Depression in caregivers has been associated with a caregiver's appraisal of the situation or resources rather than the patient's functional status (Boss et al., 1990; Carey et al., 1991; Haley, 1997; Pagel, Becker, & Coppel, 1985; Schulz, O'Brien, Bookwala, & Fleissner, 1995; Zanetti et al., 1998). These findings underscore the role of individual differences in caregiving. Personality traits represent one potential source of that individual variability (DeNeve, 1999; Enns & Cox, 1997; Hooker et al., 1992).

Indeed, Hooker and colleagues (1998) examined the contribution of personality in predicting depression in caregivers of patients with Alzheimer's Disease or Parkinson's Disease. They found that individuals high in neuroticism and low in optimism perceived a higher level of stress, which in turn, being depressed. Although such personality was related to a lower level of perceived support, social support was not directly related to depression. Instead, social support was related to perceived stress, which in turn, was related to depression. As they pointed out that social support seemed to operate to mental health, by being initiated from individuals' dispositional characteristics and being mediated by the degree to which the individual perceived a situation as stressful.

In another study, Patrick and Hayden (1999) incorporated neuroticism into a model for predicting the well-being of family members who cared for an adult child with

a chronic disability, such as mental retardation, developmental disability, or schizophrenia. Using structural equation modeling, they found that caregivers' negative well-being, defined as depression and distress, was predicted by the caregivers' neurotic personality both directly and indirectly via wishful escapism and caregiving burden, or via stress and caregiving burden.

It appears that caregivers' personality, caregiving burden, and social support are all important contributors in predicting depression in caregivers. However, how these factors are contributing remains unclear. Although Patrick and Hayden (1999) used a sophisticated model examining a priori factors simultaneously, their personality measure was limited to neuroticism. In addition, extraversion may be equally important disposition in predicting depression (Gershuny & Sher, 1998; Jorm et al., 2000; McFatter, 1994). Furthermore, as classic literature in depression or helplessness suggested (e.g., Seligman, 1975), self-efficacy would be another major component in personality to be considered to understand health consequences of caring for an ill family member (Schafer, Wickrama, & Keith, 1998; Zanetti et al., 1998).

Thus, the current study aimed to extend the findings of Hooker and colleagues study (1998) by integrating several strategies: using spousal caregivers of patients with lung cancer which are another population experiencing overwhelming caregiving stress (Biegel, Sales, & Schulz, 1991; Lowenstein & Gilbar, 2000; Teel & Press, 1999); incorporating multiple indicators of personality and sources of social support which will improve a study design; specifying burdens from providing care for a patient rather than measuring general stress which will pinpoint the mental consequences of caring for a medically ill spouse; and utilizing structural equation modeling to examine both direct

and indirect effects of personality on depression simultaneously which will provide refined results.

Personality, Social Support, and Caregiving Burden on Depression in Caregivers

Personality traits predict the onset, recurrence, and exacerbation of depression in community dwellers and medically ill patients (Russo et al., 1997), but little is known about personality and depression in caregiving contexts. Personality may directly influence depression in caregivers. It has been well documented in personality literature that individuals high in neuroticism, which refers to a predisposition to experience the state or transient fluctuations in negative mood (Tellegen, 1985), have been strongly associated with depression, distress, and dissatisfaction in any situation (Clark, Watson, & Mineka, 1994; DeNeve & Cooper, 1998; Duggan, Lee, & Murray, 1990; Enns & Cox, 1997; Jorm et al., 2000), even in the absence of overt stressors (Watson & Clark, 1984). Neuroticism in spousal caregivers of patients with Alzheimer's disease (Hooker et al., 1992; Hooker et al., 1998) and parental caregivers of patients with chronic mental disability (Patrick & Hayden, 1999) was also related to the depression in caregivers.

Contrarily, individuals high in extraversion, which refers to positive emotionality, energy, and dominance (Clark et al, 1994) have been associated with reporting larger social networks and more frequent social contact, as well as higher levels of perceived social support (Russell et al., 1997), a lower level of depression (Jorm et al., 2000), and a higher level of subjective well-being (Diener, Suh, Lucas, & Smith, in press; McCrae & Costa, 1991). A synergistic effect of high neuroticism and low extraversion predicted college student's depression in three years (Gershuny & Sher, 1998; McFatter, 1994).

In addition, self-efficacy was suggested recently as a promising personal characteristic that may reduce the adverse effect of stress in caregiving, based on several empirical findings. Individuals low in self-efficacy have reported more strain and depression associated with caregiving (Aneshensel et al., 1995; Boss et al., 1990; Felton & Revenson, 1984; Husaini et al., 1982; McNaughton et al., 1995; Pagel et al., 1985; Schafer, Wickrama, & Keith, 1998; Schumacher et al., 1993; Zanetti et al., 1998). Thus, three personality characteristics (i.e., neuroticism, extraversion, and self-efficacy) were included in this study as major components of a vulnerable trait for depression in caregiving.

Moreover, personality affects one's choice of a coping strategy (Bolger & Zuckerman, 1995; Lazarus, 1991; Saklofske & Kelly, 1995). The personality characteristics of neuroticism and extraversion were related to both social network properties and perceived social support (Russell et al., 1997). It may therefore influence depression through how individuals cope with a certain stress, the extent to which they recruit social support, and the extent to which they feel burdened by the caregiving role. The models of social support, which posit that availability of or increase in social support (during times of stress) reduces mood disturbance, have been empirically supported in a plethora of studies (e.g., Coyne & Downey, 1991; Franks & Stephens, 1996; Haley, 1997; Koopman et al., 1998; Schulz et al., 1995), both cross-sectionally and over time (McNaughton et al., 1995; Pagel, Erdly, & Becker, 1987; Redinbaugh, MacCallum, & Kiecolt-Glaser, 1995). Although spousal support has been studied the most among sources of social support (e.g., Manne & Glassman, 2000), in the case of caring for ill spouses, other sources such as adult children and friends may become important sources

(Koopman et al., 1998). Thus, the present study designed to measure the degree to which individuals received social support from three sources: spouse, child, and friends.

Caregiving burden has been also found to have a significant association with depression in caregivers (e.g., Brody, 1990; Patrick & Hayden, 1999; Pruchno, Kleban, Michaels, Dempsey, 1990; Pruchno et al., 1996, 1997; Schumacher, Dodd, & Paul, 1993; Williamson, Shaffer, & Schulz, 1998). Caregivers reported less burden in caregiving when social support was perceived as adequate rather than inadequate (e.g., Clipp & George, 1990; Vitaliano et al., 1991).

In one study, the association between social support and depression was not significant when controlling for personality characteristics (Hooker et al., 1998) and in a review, only about half (56%) of care providers reported mental or physical strain associated with caregiving (Schulz et al., 1997). Thus, the impact of social support and the caregiving burden on depression seem to reflect the impact of personality. For example, neuroticism may lead individuals to perceive that they do not receive adequate social support and/or consider caregiving as even more burdensome (Bolger & Schilling, 1991; Magnus, Diener, Fujita, & Pavot, 1993). Thus, they may become more vulnerable to depression. Extraversion and self-efficacy, however, may lead individuals to reach out more and be satisfied with the social support they receive. They may feel competent in providing caregiving (Kurtz, Kurtz, Given, & Given, 1995) and, thus, may become resilient to depression. This speculation has rarely been examined in caregiving research (except Hooker et al., 1992, 1998 and Patrick & Hayden, 1999).

It may be useful in predicting which caregivers will be more likely to succeed in adapting to the stresses of caring, and which caregivers will be more likely to need

assistance and which assistance will be most beneficial for them. Two hypotheses were proposed to test the direct effect of personality and the indirect effect through social support and/or caregiving burden on depression in caregivers, using structural equation modeling (Figure 1).

Hypothesis 1. Personality characteristics of caregivers (high in neuroticism, low in optimism and self-efficacy) will be associated with depression.

Hypothesis 2. The relationship between personality and depression will be mediated by social support (hypothesis 2-1) or caregiving burden (hypothesis 2-2) or social support and caregiving burden (hypothesis 2-3).

Insert Figure 1 About Here

Method

Participants and Procedure

One hundred seventeen spouses of lung cancer patients participated in the study. Spouses who were married to someone diagnosed with lung cancer within the past 5 years were over 18 years of age, and able to communicate verbally in English were eligible for inclusion. Participants in this study were recruited from surgery practices, the medical oncology program, and the radiation oncology programs at the University of Rochester Comprehensive Cancer Center. Informed consent was obtained and the questionnaires were asked to fill out at the time of the interview.

The average age of the participants was 62.7 years (range 26 to 89: SD = 10.1), and most participants were female (68%), Caucasian (97%), and married to and living

with the patients (98%). The mean level of education was 13.0 years. The stages of cancer in the participants' partners were: Stage I (44%), II (12%), III (29%), and IV (15%).

Measures

Personality Trait. Three measures were included to assess the high-risk personality trait. Neuroticism and extraversion were measured by each 12-item Factor N (neuroticism) or E (Extraversion) in a short version of the NEO Five Factor Index (NEO-FFI: Costa & McCrae, 1992), using a 5-point Likert scale (1 = strongly disagree, and 5 = strongly agree). Individuals high on neuroticism are characterized as worrying, nervous, emotional, insecure, inadequate, and hypochondriacal (Costa & McCrae, 1985). Individuals high on extraversion are characterized as positive affect, energetic, and dominant (Costa & McCrae, 1985). The NEO-FFI has been validated (Costa & McCrae, 1992), and its use in research in gerontology (e.g., Hooker, Monahan, Shifren, & Hutchinson, 1992; Hooker, Monahan, Bowman, Frazier, & Shifren, 1998; Lyness, Duberstein, King, Cox, & Caine, 1998; Schmmutte & Ryff, 1997) attests to its reliability and applicability to samples of older adults.

The third measure was interpersonal self-efficacy, assessed by a 5-item subscale in the Self-Efficacy Scale (Rodin, Bohm, & Wack, 1982), using a 4-point Likert scale (1 = strongly disagree, and 4 = strongly agree). The interpersonal self-efficacy measures effectiveness in dealing with spouse, family, and friends. Two-month test-retest data yielded a correlation of close to .6 (Seeman et al., 1996) and evidence for the predictive validity of the scale has been published (Seeman et al., 1996; McAvay, Seeman, & Rodin, 1996; Rodin & McAvay, 1992).

Social Support. The abbreviated 19-item version of the Duke Social Support Index (Koenig, Westlund, George, & Hughes, 1993) was used to assess three dimensions of social support: instrumental support (6 items), perceived social support (12 items), and satisfaction with social support (1 item), using a 3-point Likert scale (1 = hardly ever, 3 = most of the time). The scale has been validated with nonpsychiatric old or young adults (Koenig et al., 1993). With the exception of the social interaction subscale, participants completed each item three separate times, in reference to either their spouse, children, or close family and friends. The scores across dimensions of social support were averaged per reference of social support and labeled: spouse, child, and friend.

Caregiving Burden. A 22-item Burden Interview (BI) was used to assess the stresses and amount of perceived burden experienced by caregivers (Zarit, Rever, & Bach-Peterson, 1980; Zarit, 1982), using a 5-point Likert scale (1 = never, 5 = nearly always). The scale has two subscales: personal strain which refers to how personally stressful the experience is and role strain which refers to stress due to role conflict or overload. The scale has been validated with elderly cancer patients, their primary caregiving spouses, and their adult children (Lowenstein & Gilbar, 2000). The BI was scored by summing the responses of all items, indicating that higher score means more caregiver distress.

Depression. A 20-item Center for Epidemiologic Studies Depression Index (CES-D: Radloff, 1977) was used to measure the overall level of depression experienced more days than not in the past week, using a 4-point Likert scale (0 = rarely or none of the time, 3 = most or all of time). This measure has been used with older adults (e.g., Himmelfarb & Murrell, 1983) as well as spouse caregivers (e.g., Pruchno & Resch,

1989), and found to have excellent reliability and validity. In addition, a 17-item Hamilton Rating Scale (Hamilton, 1967) was included to measure observer-rated depression. The Hamilton Rating Scale assesses the severity of cognitive and somatic symptoms of depression. The Hamilton Rating Scale has well-established reliability and validity (Hedlund & Vieweg, 1979).

Results

Means and standard deviations of study variables are reported in Table 1. The sum of personal and role strain which were subscales in the Burden Interview was 31.26, indicating that the participants in the study were mild to moderately burdened (Zarit et al., 1980). The average CES-D score in this study was 11.2, which was higher than the average of population (between 8 and 9: Schulz et al., 1990) but was lower than the clinical cutoff score of 16.

Insert Table 1 About Here

Preliminary Analyses

Multivariate analyses of variance (MANOVA) determined whether personality (neuroticism, extraversion, and self-efficacy), social support (supports from spouse, child, and friend), caregiving burden (personal and role strain), and depression (CES-D and Hamilton) were related to caregiver's gender, age, employment status, and the patient's type of treatment. There were no significant differences (ps > .08). Thus, we did not include these caregiver's demographic and patient's medical variables in subsequent analyses.

Hypotheses Testing

Zero-order correlations among the variables included in the study model are reported in Table 2.

Insert Table 2 About Here

Model Specification. Psychometric properties of measures included in the present study to measure the proposed four latent variables (see Figure 1) were examined utilizing structural equation modeling (AMOS 4.0: Arbuckle & Wothke, 1999). The model parameters with Time 1 variables were specified as follows: the personality latent variable was measured by neuroticism, extraversion, and interpersonal self-efficacy; the social support latent variable was measured by perceived support from spouse, child, and friend; the caregiving burden latent variable was measured by personal strain and role strain; and the depression latent variable was measured by CES-D and Hamilton Depression Rating Index scores.

The following four model fit indices were used in the present study: the goodness of fit index (GFI), the confirmatory fit index (CFI), the normed fit index (NFI), and the root mean squared error of approximation (RMSEA). For the RMSEA measure, values of $<.08$ (Browne & Cudeck, 1993) and for the GFI, CFI, and NFI, values of $> .9$, reflect adequate fits of a specified model to the data (Hoyle & Panter, 1995).

A confirmatory factor analysis using a structural equation model established that all four measurements loaded on one personality construct significantly and the

model fit was satisfactory, GFI = 1.00, CFI = 1.00, NFI = .99, and RMSEA = .04, after allowing an additional error term between neuroticism and interpersonal self-efficacy to be correlated to improve the model fit. Standardized regression weights for the latent factor of personality for each of the three measures were as follows: .53 (neuroticism), -.77 (extraversion), and -.40 (interpersonal self-efficacy), ps < .02. Thus, the personality indicates a neurotic tendency with little positive, energetic, and competent individual characteristic, that is, a "vulnerable" personality.

Other latent variables were also measured satisfactorily. Social support was loaded by spouse (β = .75), child (β = .67), and friend (β = .93); caregiving burden was loaded by personal strain (β = .85) and role strain (β = .88); and depression was loaded by CES-D (β = .88) and Hamilton Rating (β = .86).

Test of the Model Structure. First, hypothesis 1 that caregivers' personality would directly predict their depression was tested. The fit of the specified model was satisfactory, indicating that personality predicted depression directly (β = .70), $\chi^2(3)$ = 2.17, GFI = .99, CFI = 1.00, NFI = .99, and RMSEA = .00. Hypotheses 2 (2-1 to 2-3) were examined simultaneously. The data fit the model depicted in Figure 1 satisfactorily, $\chi^2(28)$ = 47.59, GFI = .93, CFI = .96, NFI = .91, and RMSEA = .08. Direct and indirect effects of each path are reported in Table 3. The direct path from personality to depression remained significant when entering the proposed mediators. The significant path from personality to social support indicates that the vulnerable personality is less likely to lead individuals to pursue and be satisfied with social support they received. However, this propensity did not predict depression, which does not support hypothesis 2-1. Instead, it reduced the caregiving burden, which in

turn, reduced depression, which supports hypothesis 2-3. The path from personality to depression was mediated by the caregiving burden, such that the vulnerable personality increased the caregiving burden, which in turn, increased depression, which supports hypothesis 2-2.

Insert Table 3 About Here

Complementary Analyses for Model Comparisons. Three additional models were compared with the proposed model in the study, in order to (a) examine the significance of self-efficacy as a personality component (NE Model) and (b) rule out the bias of sharing common variance of self-report in constructs between neuroticism and depression by either excluding neuroticism from the personality latent (ESE Model) or excluding CES-D from the depression latent (HAM Model) variable.

First, the personality latent variable was measured in the NE Model by neuroticism and extraversion, but not by self-efficacy. The fit of the NE model was satisfactory, indicating that personality predicted depression directly ($\beta = .57$) as well as indirectly via social support and caregiving burden, $\chi^2(21) = 30.1$, CFI = 1.00, NFI = .99, and RMSEA = .06. In this model, the paths from personality to social support ($\beta = -.26$); from social support to caregiving burden ($\beta = -.48$); and from caregiving burden to depression ($\beta = .54$) remained significant. However, the path from personality to caregiving burden became nonsignificant, indicating competence in interpersonal relationships may be an important predictor of caregiver burden.

Second, the personality latent variable was measured in the ESE Model by extraversion and self-efficacy, but not by neuroticism. The fit of the ESE model was satisfactory, indicating that personality marginally predicted depression directly ($\beta = .40$, $p < .08$) as well as indirectly via caregiving burden, $\chi^2(21) = 28.91$, GFI = .95, CFI = .98, NFI = .94, and RMSEA = .06. In this model, the paths from social support to caregiving burden ($\beta = -.38$); and from caregiving burden to depression ($\beta = .34$) remained significant. However, the path from personality to social support became nonsignificant, indicating neurotic tendency may be an important predictor of perceived social support.

Third, the depression latent variable was measured in the HAM Model by Hamilton Depression Rating, but not by CES-D. The fit of the HAM model was satisfactory, indicating that personality predicted depression directly ($\beta = .57$) as well as indirectly via social support and/or caregiving burden, $\chi^2(21) = 32.92$, GFI = .95, CFI = .97, NFI = .92, and RMSEA = .07. In this model, the paths from personality to social support ($\beta = -.28$); from social support to caregiving burden ($\beta = -.42$); and from caregiving burden to depression ($\beta = .55$); and from personality to caregiving burden ($\beta = .29$) remained significant, indicating that the findings from the original study model were not biased by using self-report measures of personality and depression.

Discussion

The current study examined the effect of personality on depression in spousal caregivers of lung cancer patients. The results showed that the personal characteristics, high in neuroticism and low in extraversion and self-efficacy, were associated with a higher level of depression directly or indirectly through operating social support system to increase burdens in caregiving. The findings on the association between neuroticism,

extraverion, and depression are consistent with previous studies (e.g., Hooker et al., 1992; Hooker et al. 1998). The empirical finding in the current study about the speculation that self-efficacy would be a significant personality component in predicting depression broadens the knowledge about the function of personality in health consequences of caring for an ill spouse.

It is interesting that social support, when including the variances accounted for by personality, was not associated with depression in this study, which is consistent with the finding in Hooker and colleagues (1998). Instead, the effect of social support on depression was indirect via the caregiving burden. In other word, when controlling for the effect of caregiving burden on depression, social support was not a significant predictor of depression. Contrary to the finding that caregiving burden was influenced by the personality as well as stood alone in predicting depression in caregivers, it seems that the association between perception and satisfaction with social support and depression rely heavily on one's personality. Thus, the findings suggest that spousal caregivers' depression may be predicted by their dispositional tendencies in neuroticism, extraversion, and self efficacy; perceived social support which is associated with the level of caregiving burden; and the degree to which they experience personal and role strains from caregiving an ill spouse.

The findings suggest that dispositional distress aggravates the adverse effect of caregiving stress, while dispositional extraversion and self-efficacy protects the caregiver from negative consequences of the stress. Some caregivers who may be vulnerable to depression will benefit from services to lessen caregiving burdens or from intervention programs to help them improve social support seeking skills which can reduce the burden

of caring for their ill spouses. It seems that caregivers may not benefit from simply having social support. Spousal caregivers who are identified as having dispositional tendencies to become distressed in the caregiving context can be targeted early on for interventions which designed to aim at lessening depressive symptoms and thereby improve the quality of care they provide to their ill spouses (Williamson et al., 1998).

The indirect effects via social support and caregiving burden in the association between personality and depression suggest that interventions that modify caregivers' perception and satisfaction with social support which lead to alleviate caregiving burden may have a stronger effect for preventing them from being depressed. Interventions emphasizing education and information about medical treatment and disease process (Haley, 1997; Horowitz, Passik, & Malkin, 1996) and focusing on improving problem solving skills (Toseland, Blanchard, & McCallion, 1995), and providing respite services such as adult day care or sitter services (Haley, 1997) appear to be effective in reducing caregiving burden, which in turn may reduce depression in caregiving.

Limitations in the present study design and interpreting the current findings should not be overlooked. The present study used only spouse's reports. Patient's characteristics such as personality, social support seeking and receiving styles, and the level of depression, as well as relationship history between the patient and the spouse may be significant contributors in understanding caregiving consequences. For example, spousal caregivers who had highly mutual communal relationships with the patients experienced depression for losing intimate and affectional activities with their partner, while those who had lack of communal relationships distressed by focusing on how their caregiving responsibilities hindered personal pastimes and activities (Willamson et al.,

1998). In addition, cross-sectional design prevents from inferring causal relations among study variables. Furthermore, including physical health consequences of caregiving and replicating the current findings with groups of caregivers from different disease will enrich the proposed model in the present study.

The findings suggest the importance of understanding caregiver's personality, maximizing social support, and minimizing caregiving burden in order to promote caregiver mental health. Although strain may to some extent be inherent in the caregiving situation (Williamson et al. 1998) and caregiving becomes a normative developmental task, it may be possible to minimize the adverse impact of caregiving. As Aneshensel and colleagues (1995) pointed out, people accommodate the stress of caregiving and report positive consequences of caregiving such as growth experience. The findings in the present study imply what Aneshensel and colleagues (1995) call "stress proliferation" could be influenced by personality directly or indirectly through social support and caregiving burden.

Author Note

Youngmee Kim, Mount Sinai School of Medicine, New York, NY; Paul R. Duberstein, Silvia Sorensen, and Kenneth R. Conner, University of Rochester School of Medicine, Rochester, NY.

This project was financially supported in part by Public Health Service grant K07-MH01135. We wish to extend our appreciation to Jill Guary, Susan Jackson, and Nathan Franus for their assistance in data collection; to Dr. Richard Feins, Dr. David Johnstone, and other Cancer Center physicians for providing access to patients; and to all the families who participated in this investigation. We dedicate the current research to the memory of Heekyoung Kim.

Correspondence concerning this article should be addressed to Youngmee Kim, Cancer Prevention and Control, Mount Sinai School of Medicine, One Gustave Levy Place, Box 1130, New York, NY 10029-6574. Electronic mail may be sent to youngmee.kim@mssm.edu.

Table 1. Descriptive Information on Study Variables

	Mean	SD
Personality Traits		
Neuroticism	16.40	6.95
Extraversion	27.40	4.96
Interpersonal SE	12.00	1.75
Social Support		
Spouse	32.56	4.18
Children	33.21	6.31
Friend	35.03	5.32
Caregiving Burden		
Personal strain	21.52	6.12
Role strain	9.74	4.02
Depression		
CES-D	11.20	8.98
Hamilton	8.21	6.39

Note: Interpersonal SE = Interpersonal Self-Efficacy;
Spouse = Spouse's Social Support; Children = Children's Social Support;
Friend = Friend's Social Support: CES-D = Center for Epidemiologic Studies Depression Index;
Hamilton = Hamilton Depression Rating

Table 2. Zero-order Correlations Between Variables Included in the Structural Models

	1	2	3	4	5	6	7	8	9	10
1. Neuroticism	-									
2. Extraversion	-.40***	-								
3. Interpersonal SE	-.21*	.31***	-							
4. Spouse	-.17+	.14	.21*	-						
5. Children	-.09	.00	.07	.53***	-					
6. Friend	-.20*	.17+	.13	.71***	.63***	-				
7. Personal strain	.16+	-.10	-.37***	-.25**	-.25**	-.43***	-			
8. Role strain	.13	-.19*	-.39***	-.33***	-.29**	-.42***	.75***	-		
9. CES-D	.54***	-.28**	-.38***	-.23**	-.12	-.26**	.45**	.45***	-	
10. Hamilton	.41***	-.32***	-.36***	-.37***	-.24**	-.34***	.50***	.53***	.76***	-

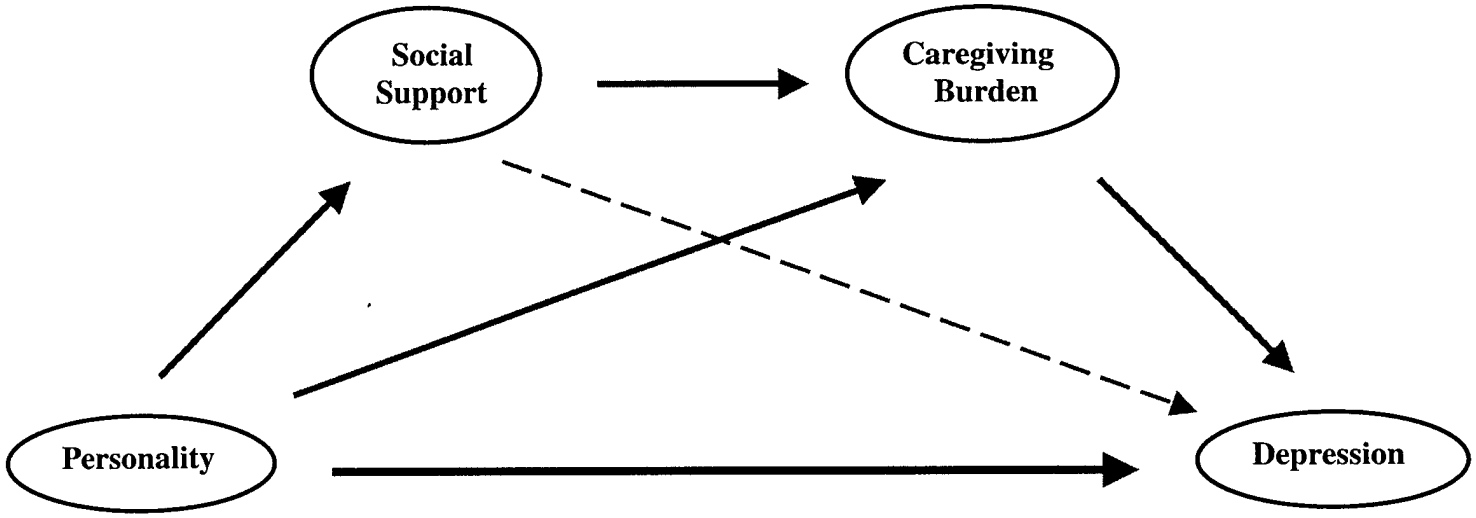
+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Note: Interpersonal = Interpersonal Self-Efficacy; Spouse = Spouse's Social Support;
Children = Children's Social Support; Friend = Friend's Social Support;
CES-D = Center for Epidemiologic Studies Depression Index;
Hamilton = Hamilton Depression Rating

Table 3. Standardized Estimates of Direct, Indirect, and Total Effects

	Direct Effect	Indirect Effect	Total Effect
Personality → Social Support	-.26*	-	-.26*
Personality → Caregiving Burden	.25*	.12	.37*
Personality → Depression	.53**	.16	.69***
Social Support → Caregiving Burden	-.44***	-	-.44***
Social Support → Depression	-.01	-.19	-.20
Caregiving Burden → Depression	.43***	-	.43***

* $p < .05$ ** $p < .01$ *** $p < .001$


Social Support
Caregiving Burden
Personality
Depression

Paper Session #17 2:15 p.m.

LEUKOCYTE REDISTRIBUTION IN ASTRONAUTS FOLLOWING THE STRESS OF SPACEFLIGHT

Paul J. MIls, Ph.D., Janice M. Fritsch-Yelle, Ph.D., Wendy W. Waters, Ph.D., Dominick D'Aunno, M.D., Michael G. Ziegler, M.D., University of California, San Diego, La Jolla, CA, Johnson Space Center, Houston, TX, National Space Biomedical Research Institute, Baylor College of Medicine, Houston, TX

Peripheral leukocyte numbers and catecholamine levels were examined prior to launch and after landing in 11 astronauts who flew aboard 5 US Space Shuttle flights ranging in duration from 4 days to 16 days. Spaceflight was associated with a significant increase in the number of circulating WBC ($p<0.01$), including neutrophils ($p<0.01$), monocytes ($p<0.05$), CD3+CD4+ T helper cells ($p<0.05$) and CD19+ B cells ($p<0.01$). The number of CD3-CD16+56+ natural killer (NK) cells, however, was decreased ($p<0.01$). Plasma norepinephrine was increased at landing ($p<0.01$) and correlated significantly with WBC ($p<0.01$), neutrophils ($p<0.01$), monocytes ($p<0.01$), and B cells ($p<0.01$). Astronauts who were in space for approximately one week showed a significantly larger increase upon landing in plasma norepinephrine ($p=0.02$) and epinephrine ($p=0.03$) levels as compared to astronauts in space for approximately two weeks. In addition, astronauts who were on the shorter duration missions showed an increased number of circulating CD3+CD4+ T helper ($p<0.05$) and CD3+CD8+ T cytotoxic ($p<0.05$) cells as compared to the longer duration mission astronauts. The data suggest that the stress of spaceflight and landing may lead to a sympathetic nervous system-mediated redistribution of circulating leukocytes, an effect attenuated following longer missions.

CORRESPONDING AUTHOR: Paul J. Mills, UCSD Medical Center, 200 West Arbor Drive, San Diego, CA 92103–0804; 619–543–2506; 619–543–7517 (fax); pmills@ucsd.edu

Paper Session #17 2:30 p.m.

STRESS AND CELLULAR IMMUNITY: EVIDENCE FOR AN INDIVIDUAL DIFFERENCES APPROACH

Suzanne C. Segerstrom, Ph.D.; Jay O. Castaneda, B.A.; and Theresa E. Spencer, B.A.

Personality can affect immunological responses to stress, accounting for substantial additional variance. This investigation examined the utility of the five-factor model of personality (FFM) in moderating immune responses during acute and chronic achievement stressors and tested the unique predictive ability of social inhibition, optimism, and hostility over FFM dimensions. Thirty healthy medical and law students had two delayed-type hypersensitivity skin tests. Half were tested first during examinations and second after vacation, and the other half in the reverse order. In addition, half completed a mental arithmetic task before skin test administration. When stressor characteristics were tested, skin test responses tended to be larger at the first visit regardless of examinations ($p < .06$). Within the FFM, extraversion moderated this effect ($p < .0005$) as did, at the level of a trend, neuroticism ($p < .09$). Introversion and neuroticism positively correlated with skin test response at the first time point, but not at the second. In addition, conscientiousness interacted with acute stress ($p < .04$), such that conscientiousness negatively correlated with skin test response in the acute stress condition. Among more traditional health psychology personality measures, social inhibition moderated the order effect ($p < .0005$) as did dispositional optimism, though at the level of a trend ($p < .09$). Academic optimism interacted with acute stress ($p < .03$). There was evidence that social inhibition and academic optimism accounted for variance above and beyond the FFM. The results provide support for an individual differences approach to effects of stressors on the immune system and for personality-situation interactions: Affective dimensions interacted with situation novelty, achievement dimensions interacted with mental arithmetic, and interpersonal dimensions had no effect.

CORRESPONDING AUTHOR: Suzanne C. Segerstrom, Ph.D., Department of Psychology, University of Kentucky, Lexington, KY 40506–0044

Paper Session #18 1:15 p.m.

THE CRISIS OF PSYCHOSOCIAL INTERVENTION IN CANCER AND QUALITY ENGINEERING AS A RESOLUTION

James C. Coyne, Ph.D., University of Pennsylvania; Naihua Duan, Ph.D., University of California, Los Angeles; Frances Barg, Ph.D., Steven C. Palmer, Ph.D., and Ashraf Kagee, Ph.D., University of Pennsylvania

Under optimal conditions, psychosocial interventions for cancer patients have been shown to increase satisfaction and quality of life and reduce distress. While the efficacy of such interventions is not in question, their effectiveness in routine care remains in doubt. Clinical trials are plagued by low accrual and retention rates, and the patients most in need are unlikely to participate. The result is unrepresentativeness in sampling of patients and settings and poor generalizability. Interventions requiring highly trained professionals and substantial time commitments have low likelihood of adoption. Available interventions are unlikely to have a substantial impact on the cancer patients on a population basis. This presentation will document these claims and offer solutions from consumer and social marketing research and quality engineering. At the heart of these recommendations are shifts toward stakeholder participation in the design of interventions and attention to questions of generalizability and integration into routine care. Generalizability depends on systematic efforts to insure stakeholder buy-in from the outset, and not as an afterthought to theory-driven construction of interventions. Our premise is that intervention marketability can be increased through efforts to insure that they are user-friendly, perform robustly, and accommodate consumers' needs, desires, and capabilities. Overall, efficacious interventions that do not appeal to stakeholders are unlikely to be disseminated successfully. The presentation will draw upon case examples, including ongoing efforts to re-design an existing caregiver intervention to insure its acceptability in the African-American community.

CORRESPONDING AUTHOR: James C. Coyne, Ph.D., University of Pennsylvania, HUP 3400 Spruce St., 11 Gates, Philadelphia, PA 19104

Paper Session #18 1:30 p.m.

DEPRESSION IN SPOUSES OF PEOPLE WITH LUNG CANCER: PERSONALITY, SOCIAL SUPPORT, AND CAREGIVING BURDEN

Youngmee Kim, Ph.D. and Paul R. Duberstein, Ph.D., University of Rochester School of Medicine

Personality traits predict the onset, recurrence, and exacerbation of depression in community dwellers, but little is known about personality and depression in other contexts. We used structural equation modeling to address this issue in a study of 117 spouses of lung cancer patients. We examined (a) the direct relation between personality and depression (measured by the CES-D) and (b) the indirect relation through the hypothesized mediators of social support (Duke Index) and caregiver burden (Zarit Scale). A latent variable, derived from the NEO-FFI Neuroticism scale, the LOT-R (Optimism) and Rodin Self-Efficacy scale was created to measure high-risk traits that increase risk of depression. Results showed that the direct path from high-risk traits to depression was significant when the hypothesized mediators were excluded from the model, chi-square = 4.42, GFI = .99, and RMSEA = .03. The overall model remained significant when the mediators were included, chi-square = 51.86, GFI = .93, and RMSEA = .08. The link between high-risk traits and depression was mediated by caregiver burden, not by social support. High-risk traits were marginally associated with caregiver burden (beta = .19, $p < .08$), which, in turn, increased depression (beta = .46, $p < .001$). The relation between social support and depression was mediated by caregiver burden. Higher levels of social support were associated with decreased burden (beta = –.46, $p < .001$), which, in turn, reduced depression (beta = –.46, $p < .001$). These findings are generally consistent with the literature on depression in community samples and suggest that spousal caregivers at risk for depression may benefit from programs that can help allay the strains associated with the caregiving role.

CORRESPONDING AUTHOR: Youngmee Kim, Ph.D., Behavioral Medicine, University of Rochester School of Medicine, 601 Elmwood Ave., Box 704, Rochester, NY 14642, USA

Paper Session #18 Citation 1:45 p.m.

DISCOURSE ANALYSIS OF A STRUCTURED BREAST CANCER SUPPORT GROUP

Georg W. Alpers, Dipl.-Psych., Andrew J. Winzelberg, Ph.D., Catherine Classen, Ph.D., Parvati Dev, Ph.D., Cheryl Koopman, Ph.D., and C. Barr Taylor, M.D., Behavioral Medicine Media Laboratory, Stanford University

Participation in support groups has been found to be beneficial for women with breast cancer. Thousands of support groups are offered on the Internet but there is little research examining if and how they work. This study evaluates the discourse of an on-line breast cancer support group. The group was an 11-week semi-structured and moderated program. Each week group members were presented with content germane to the topic and designed to trigger the discussion. The 9 participants who had been diagnosed with primary breast cancer (mean age 53.1) and the moderator posted a total of 521 messages during the intervention. Participants logged on to read or write throughout the week and at all times of day. Individual patients posted an average of 4.6 (range 2.4–7.9) messages per week averaging 126 words per message (range 1–915). To increase the efficiency and accuracy of content analysis, we used Pennebaker and Francis' (1999) software, which maps relevant psychological dimensions. Their dictionary captured 83% of the words in the messages. The discourse pattern was stable throughout the intervention. A high percentage of words referred to positive concepts (5.6%) and fewer to negative concepts (1.7%). Social issues was the category most frequently used (10.7%). Moreover, post-intervention evaluations indicate that participants felt supported and trusted each other. Participants reported appreciating the 24-hour accessibility of the group, and they participated at times when traditional face-to-face groups are not available. Future studies should examine if the discourse pattern can predict treatment outcome of online groups.

CORRESPONDING AUTHOR: Andrew J. Winzelberg, Ph.D., Psychiatry and Behavioral Sciences, 401 Quarry Rd., Stanford, CA, 94305–5722, USA

Paper Session #18 2:00 p.m.

INHIBITING DEVELOPMENT OF ANTICIPATORY NAUSEA: THE EFFECTS OF FAMILY SUPPORT, PATIENT'S ANXIETY, AND POST-TREATMENT NAUSEA

Youngmee Kim, Ph.D., Gary R. Morrow, Ph.D., M.S., Joseph A. Roscoe, Ph.D. and Jane T. Hickok, MD., M.P.H., University of Rochester School of Medicine

The degree of support in the family has been suggested as a psychological predictor of chemotherapy-related nausea, however, how it predicts remains unclear. This study examined the potential role of family support in the development of anticipatory nausea, directly or indirectly through reducing either a patient's anxiety or development of post-treatment nausea. Nine hundred sixty four cancer patients from 21 Community Clinical Oncology Program sites were studied. The patients completed the Family Environment Scale, anxiety measures (e.g., STAI and POMS), and the Morrow Assessment of Nausea and Emesis (MANE), before their second chemotherapy treatment. A questionnaire packet, including the anxiety measures and the MANE, was then given to the patient to complete after each chemotherapy treatment up to and including the fifth treatment. The full model, including direct and indirect paths, was examined at each infusion from the second through the fifth. The fits of the specified model were satisfactory. Results from structural equation modeling suggest that family support plays an important role in reducing a patient's anxiety, which, in turn, inhibits subsequent development of chemotherapy-related anticipatory nausea. Specifically, the paths from family support to anxiety (–), from anxiety at N – 1 to post-treatment nausea at N – 1 (+), from anxiety at N – 1 to anticipatory nausea at N (+), and from post-treatment nausea at N – 1 to anticipatory nausea at N (+) were significant across infusions. The findings support the general proposition from the family systems theory and provide empirical evidence that the family influences a patient's adjustment to medical situations, specifically, nausea related to chemotherapy. The findings also suggest that patients and families will benefit from intervention programs which help them express feelings openly while avoiding conflict and criticism, and maintaining a balanced family structure.

CORRESPONDING AUTHOR: Youngmee Kim, Ph.D., Behavioral Medicine, University of Rochester School of Medicine, 601 Elmwood Ave., Box 704, Rochester, NY 14642, USA

Paper Session #18 2:15 p.m.

CHANGE IN POST-TRAUMATIC STRESS SYMPTOMS FOLLOWING PSYCHOSOCIAL TREATMENT FOR BREAST CANCER

Ellen G. Levine, Ph.D., M.P.H. and Elisabeth Targ, M.D., California Pacific Medical Center

The diagnosis of cancer is a traumatic experience, which may result in post-traumatic stress symptoms, such as arousal, re-experiencing the diagnostic or treatment process, and arousal. Change in post-traumatic symptoms was assessed in 177 women with breast cancer who participated in either a standard support group or an integrated program using support, yoga, meditation, movement and imagery. At baseline 45 women were classified as having significant PTSD symptoms (at or above the 75%ile of the entire sample). In addition, 44 women reported significantly higher re-experiencing symptoms, 46 had high avoidance symptoms, and 50 reported high arousal. After the 12-week sessions, significant decreases were seen in all four areas, with the number of women rated as having significant PTSD decreased to 17 women. The number of women having high re-experience symptoms fell from 44 to 16 (ns), while the number of women who reported high avoidance fell from 46 to 20 (Chi2= 5.5. p=.02), and the number of women who reported being highly aroused decreased from 50 to 21 (Chi2= 15. p=.0001). For the entire sample, overall PTSD symptoms were significantly reduced (t=–3.56, p=.0005). Significant decreases were also observed in re-experiencing (t=–2.77, p=.007), avoidance (t=–2.3, p=.02), and arousal (t=–3.14, p=.002). There were no differences between the two interventions. These results indicate that PTSD symptoms can be prevalent among women with breast cancer, and that psychosocial interventions can be effective in reducing this type of distress

CORRESPONDING AUTHOR: Ellen G. Levine, Ph.D., M.P.H., California Pacific Medical Center, 1701 Divisadero St., Suite 150 San Francisco, California 94115

Paper Session #19 1:15 p.m.

PATIENT PERSONALITY PREDICTS MORTALITY IN CHRONIC RENAL INSUFFICIENCY: A FOUR-YEAR PROSPECTIVE EXAMINATION

Alan J. Christensen, Ph.D., Shawna Ehlers, M.A., William J. Lawton, M.D., Katherine Raichle, M.A., and Karin Ferneyhough, M.A., The University of Iowa and The University of Iowa College of Medicine, John Wiebe, Ph.D., The University of Texas at El Paso, and Patricia J. Moran, Ph.D., The University of California at San Francisco

Interest in the potential effects of patient personality on disease-related morbidity and mortality has spanned centuries with a particular emergence of interest over the past several decades. In the present study we examined the role of personality as a predictor of mortality among patients with chronic renal insufficiency over an average 49 month follow-up period. Cox-regression was used to evaluate the effects of five dimensions of personality (the "Five Factor Model") after controlling for significant clinical and demographic predictors. A total of 174 patients with serum creatinine levels > 3.0mg/dL were enrolled in the research and provided complete data (mean age = 54.42 years, 57.5% male 42.5% female). At follow-up, 49 patients had died. Significant demographic and clinical predictors of survival included age ($p < .0001$), diabetic status ($p < .001$), hemoglobin level ($p < .01$) and renal replacement status at follow-up ($p < .05$). After controlling for these clinical and demographic predictors, two personality traits, conscientiousness ($p < .01$) and neuroticism ($p < .05$) predicted patient mortality. Patients with high neuroticism scores had a 40.7% higher estimated mortality. Patients with low conscientiousness scores had a 46.5% increased mortality rate. Our data suggest that personality assessment may play a useful role in the risk stratification of chronic renal insufficiency patients.

CORRESPONDING AUTHOR: Alan J. Christensen, Ph.D., Department of Psychology, E11 Seashore Hall, The University of Iowa, Iowa City, IA 52242, USA

Inhibiting Development of Anticipatory Nausea in Patients with Breast Cancer: The Effects of Family Support, Anxiety, and Post-Treatment Nausea

Youngmee Kim, Gary R. Morrow, Joseph A. Roscoe, and Jane T. Hickok

University of Rochester School of Medicine

Running Head: Family Support and Chemotherapy-Related Nausea

Correspondence to:

Youngmee Kim, Ph.D.
Cancer Prevention and Control
Mount Sinai School of Medicine
One Gustave Levy Place, Box 1130
New York, NY 10029-6574
Telephone: (212) 659-5646 Fax: (212) 849-2564
E-mail: youngmee.kim@mssm.edu

Abstract

Nausea is one of most frequent side effects of chemotherapy for cancer. The degree of support in the family environment has been suggested as a psychological predictor of nausea, although how it serves this purpose remains unclear. This study examined the potential role of family support in the development of anticipatory nausea, either directly or indirectly by reducing a patient's anxiety. Five hundred forty patients with breast cancer were studied. The results supported the indirect effect of family support through anxiety in the development of both anticipatory and post-treatment nausea. A significant contribution of family support in the development of anticipatory nausea was found above and beyond the contribution of post-treatment nausea. Results from structural equation modeling suggest that family support helps reduce a patient's anxiety, which, in turn, inhibits development of chemotherapy-related anticipatory nausea.

Key Words: family support, anxiety, development of chemotherapy-related nausea; anticipatory nausea

Inhibiting Development of Anticipatory Nausea in Patients with Breast Cancer: The Effects of Family Support, Anxiety, and Post-Treatment Nausea

Nausea, a subjective, unpleasant feeling that may trigger vomiting, is one of the most frequently reported and troublesome adverse effects of chemotherapy for cancer (Morrow, Roscoe, & Hickok, 1998). Approximately 60% of patients develop nausea after treatment (post-treatment nausea) and 25% of patients develop nausea prior to treatment (anticipatory nausea) (Morrow & Roscoe, 1998). Chemotherapy-related nausea detracts significantly from a patient's quality of life and may even lead to a discontinuation or avoidance of treatments (Newell, Sanson-Fisher, Girgis, & Bonaventura, 1998).

Post-treatment nausea is assumed to have pharmacological as well as psychological causes, while anticipatory nausea is assumed to be a conditioned response and primarily psychological in origin (Andrykowski & Jaconsen, 1993; Morrow et al., 1998; Tomoyasu, Bovbjerg, & Jacobsen, 1996). Despite the use of increasingly potent antiemetic medications, such as 5-HT_3 receptor antagonists, the prevalence of nausea remains high (Morrow & Roscoe, 1998). The psychological contribution to chemotherapy-related nausea, particularly to anticipatory nausea, gives hope that non-pharmacological or psychological methods to relieve the symptoms may be efficacious. Further study of the psychological components and predictors of nausea is indicated.

Social support has been shown to play a beneficial role in a patient's psychological and physical adjustment to various diseases, including cancer (for review, see Cohen & Herbert, 1996; Spiegel & Kato, 1996). Among the several forms of social

support, family support has been found to be the most important resource in a patient's adjustment to cancer (Fobair & Zabora, 1995; Lewis, Hammond, & Woods, 1993).

Family support is generally viewed as the degree to which family members relate to and communicate with each other, pursue goals, organize activities, and perform family routines and procedures (Moos & Moos, 1986). According to the family systems theory (Steinglass, 1987), family support encompasses the dynamics between a family's growth (morphogenetic) tendency to become more complex in its structure and its regulatory (morphostatic) tendency to maintain stability and order over time. The two tendencies are hypothesized to interact consistently and to balance out for healthy family functions. In healthy populations, an unbalanced or disruptive family environment has been related to increased psychosomatic complaints from family members (Holahan & Moos, 1986). Because cancer in a family member can be a significant destabilizer (Lederberg, 1998), how the family functions when facing the illness and the impact of family functioning on the patient's adjustment may become greater in the context of cancer.

A number of studies have found that a patient's psychological adjustment to cancer is better in a family characterized by cohesiveness, open expression, and absence of conflict (Carter & Carter, 1993; Fobair & Zabora, 1995; Friedman, Baer, Nelson, Lane, Smith, & Dworkin, 1988; Friedman, Lehane, Webb, Weinberg, & Cooper, 1994; Koopman, Hermanson, Diamond, Angell, & Spiegel, 1998; Mesters, van den Borne, McCormick, Pruyn, deBoer, & Imnos, 1997; Molassiotis, van den Akker, & Boughton, 1997; Northouse, 1995; Spiegel, Bloom, & Gottheil, 1983). Such family characteristics have also been associated with reduced chemotherapy-related symptoms, including

fatigue and nausea (Bloom, 1982; Friedman et al., 1988; Friedman et al., 1994; Jamison, Burish, & Wallston, 1987; Mesters et al., 1997; Peters-Golden, 1982; Spiegel, Bloom, & Gottheil, 1983; Williams, 1989). In addition, the family's role flexibility and how the family is structured (Moos & Moos, 1986) influence the patient's ability to adapt to the demands of cancer and its treatment (Williams, 1989).

The results suggest that these characteristics of the family environment will be associated with the patient's anticipatory nausea. The mechanism, however, by which family support influences the development of nausea in a patient is unclear. In addition, it is difficult to draw satisfactory conclusions from most published studies because of their cross-sectional or retrospective design (e.g., Friedman et al., 1994; Spiegel et al., 1983). To date, only one prospective study has directly examined how the family might facilitate or inhibit the development of chemotherapy-related nausea (Williams, 1989). Williams found that family disruption, defined as low expressiveness and cohesion, and high conflict was related to the development of anticipatory nausea during the first five chemotherapy treatments in patients with various types of cancer. However, the findings in Williams' study were derived from correlational analyses and need cautious interpretation.

A patient's level of both anxiety and of post-treatment nausea have been suggested, as mediators of the development of anticipatory nausea. Family support has been negatively associated with patient's anxiety (e.g., Friedman et al., 1994; Koopman et al., 1998). In addition, anxiety is assumed to predispose some individuals to learn quickly the association between certain stimuli and the drug-induced side-effects of post-treatment nausea, thereby contributing to the conditioned response of anticipatory nausea

(Andrykowski, 1990; Jacobsen, Bovbjerg, & Redd, 1993; Morrow, Roscoe, Kirshner, Hynes, & Rosenbluth, 1998). Because anxiety is related to both anticipatory nausea and family support, it is logical to speculate that anxiety may be a potential mediator of the relation between family support and development of anticipatory nausea. Furthermore, experiencing post-treatment nausea is assumed to be a necessary factor in the association (conditioning) process (Andrykowski & Jacobsen, 1993; Tomoyasu, Bovbjerg, & Jacobsen, 1996).

The prospective design in the current study allows us to test the impact of both a direct and an indirect role of family support in the development of anticipatory and post-treatment nausea: (a) a supportive family environment may directly inhibit the development of a patient's nausea and (b) a supportive family environment may reduce a patient's anxiety, which, in turn, leads to reduced nausea. Thus, family support is hypothesized to have either a direct effect or an indirect effect via anxiety on the development of a patient's chemotherapy-related nausea. The model tested (Figure 1) also includes the contribution of the unconditioned response (post-treatment nausea) to anticipatory nausea development. (c) Post-treatment nausea will impact directly on the development of anticipatory nausea.

Insert Figure 1 About Here

Method

Participants

The sample reported in Hickok and colleagues (1999) were utilized in the current study. Four male breast cancer patients in Hickok et al's study were excluded, thus, 688 female patients with breast cancer were included in the study. Five hundred forty subjects completed through first five treatments, and 148 did not (22%). Those who did not complete the five treatments reported greater severity and duration post-treatment nausea from infusion one to four; and greater severity and duration of anticipatory nausea at infusion four ($ts > 2.10$, $ps < .05$).

The average age of the 540 patients was 51 years (range 24 to 83), and most patients were married (75%), Caucasian (94%), and had at least a high school education (93%).

Measures

Family Support. The Family Environment Scale (FES) assesses the environment where a family creates and imposes expectations and demands for behavior upon its members (Moos & Moos, 1986), and was used to assess the degree to which a patient perceives support from the family. Five subscales tap into assessing family relationships and family system (45 items) were selected as measures of supportiveness of the family environment (Williams, 1989). Three of these subscales (cohesion, expressiveness, and conflict) describe characteristics of family relationships. According to the definition by Moos and Moos' (1986), cohesion is the degree of commitment, help, and support that family members provide for one another. Expressiveness is the extent to which family members are encouraged to act openly and to express their feelings directly. Conflict is the amount of openly expressed anger, aggression, and disagreement among family members.

The other two subscales (organization and control) are part of a construct domain generally seen as system maintenance. Organization is outlined as the degree of importance of clear organization and structure in planning family activities and responsibilities. Control is the extent to which set rules and procedures are used to regulate family life. Subscales' test-retest reliability for an eight-week interval range from .68 to .86 (Moos & Moos, 1986). The psychometric properties and validity of the FES have been established (Sanford, Bingham, & Zucker, 1999).

Anxiety. The extent to which the patients experienced nervousness, tension, and other correlates of anxiety was measured using two scales. (a) The State and Trait Anxiety Inventory (STAI: Spielberger, Gorsuch, & Luschene, 1974), which is a self-report inventory with 20 items each for trait and state anxiety. Items are rated on a 5-point scale of distress (0 - 4), ranging from "not at all" to "extremely". Only the state anxiety score was included in the analyses. (b) The anxiety subscale of the Profile of Mood States (POMS; McNair, Lorr, & Droppelman, 1971) is also a self-report inventory with 12 items rated on a 4-point scale (0 - 3), ranging from "not at all" to "extremely." The POMS was used to measure the level of anxiety at that moment. Both the STAI and the POMS scales have been widely used, and their reliability and validity have been well documented (Curran, Andrykowski, & Studts, 1995; Spielberger, Sydeman, Owen, & Marsh, 1999). Both measures were included in the analyses to improve measurement reliability of anxiety latent variable.

Anticipatory and Post-Treatment Nausea. The Morrow Assessment of Nausea and Emesis (MANE: Morrow, 1992) was used to assess nausea. The MANE is a patient self-report measure of severity (measured on a 6-point scale from 0 = "not at all" to 6 =

"intolerable") and duration (in hours) of both pre- and post-treatment nausea. The scale has been used in over two dozen recent research studies and its psychometric validity and reliability have been established (Carnrike et al., 1988; Morrow, 1992).

Procedure

Eligible patients were recruited at each participating site at the time of their first chemotherapy treatment. Patients who agreed to join the study signed a consent form, and demographic and clinical data were gathered from medical charts. At the second chemotherapy treatment (before drugs were administered to the patient), the patient completed the FES and the anxiety measures. The patient also completed the MANE regarding the first treatment. A questionnaire packet, including the anxiety measures and the MANE, was then given to the patient to complete after each chemotherapy treatment up to and including the fifth treatment. Patients were asked to return these questionnaires one week following each chemotherapy treatment using a stamped, self-addressed envelope. Compliance with this procedure was high; on the rare occasion that a participant failed to return the form(s), a reminder contact was made by phone.

Results

Means and standard deviations of study variables are reported in Table 1. Zero-order correlations among the family environment subscales are reported in Table 2 and zero-order correlations among the anxiety and nausea measures across treatment infusions are reported in Table 3. Then, zero-order correlations between the family environment subscales and anxiety, nausea measures across treatment infusions are reported in Table 4.

Insert Tables 1, 2, 3 and 4 About Here

Model Specification

Psychometric properties of measures included in the present study to measure the proposed four latent variables (see Figure 1) were examined utilizing structural equation modeling (AMOS 4.0: Arbuckle & Wothke, 1999). The model parameters were specified as follows: the family support latent variable was measured by the five subscales of the FES; the anxiety latent variable was measured by the STAI and the POMS anxiety subscale; and anticipatory and post-treatment nausea latent variables were measured by the severity and duration of the respective symptom[1].

The following four model fit indices were used in the present study: the goodness of fit index (GFI), the confirmatory fit index (CFI), the normed fit index (NFI), and the root mean squared error of approximation (RMSEA). For the RMSEA measure, values of <.08 (Browne & Cudeck, 1993) and for the GFI, CFI, and NFI, values of > .9, reflect adequate fits of a specified model to the data (Marsh, Balla, & McDonald, 1988).

A confirmatory factor analysis using a structural equation model established that all five subscales loaded on one Family Support construct significantly and the model fit was satisfactory, GFI = 1.00, CFI = 1.00, NFI = 1.00, and RMSEA = .05, after allowing additional error terms to be correlated to improve the model fit[2]. Standardized regression weights for the latent factor of family support for each of the five subscales were as follows: .85 (cohesion), .43 (expression), -.64 (conflict), .57 (organization), and -.14 (control), ps < .01. Thus, a "supportive" family environment

indicates a cohesive family relationship which encourages emotional expression with little conflict and an organized family system with little control.

The anxiety scores measured by the STAI and the POMS were highly correlated ($.76 < \underline{r}s < .88$, $\underline{p} < .001$), and were therefore satisfactory observed variables for the anxiety latent variable. The severity and duration observed variables for each anticipatory nausea and post-treatment nausea latent variable loaded significantly across all treatment infusions (standardized regression weights ranged from .57 to 1.01, $\underline{p}s < .001$).

Test of the Model Structure: Direct Effects

Steps suggested by Baron and Kenny (1986) to examine effects of mediators in a target relationship were taken. First, whether or not characteristics of the family environment (family support) directly impede the development of anticipatory nausea was tested from the second to the fifth infusions, excluding hypothesized mediators. As shown in upper half of Table 5, family support was significantly associated with the development of anticipatory nausea. Second, if family support is significantly associated with hypothesized mediators was examined from the first to the fourth infusions. As shown in upper half of Table 5, family support was significantly and negatively associated with patient's anxiety, and tended to be negatively associated with the development of post-treatment nausea.

Insert Table 5 About Here

Third, the hypothesized mediators (anxiety and post-treatment nausea) were included in the full model, depicted in Figure 1. The fit of the specified model was examined at each infusion from the second to the fifth. The symptoms of anticipatory nausea at infusion N (RX_N) are hypothesized to be predicted by the characteristics of the family which were measured at the beginning of the study, the level of state anxiety at the previous infusion (RX_N – 1), and the post-treatment nausea at the previous infusion (RX_N – 1).

The fits of the specified model at all four treatments were satisfactory (see lower half of Table 5), indicating that the general structure of the specified model was acceptable. Specifically, the path from family support to anxiety was significant at all four infusions, indicating that a more supportive family environment is associated with lower patient anxiety. The path from family support to post-treatment nausea was not significant at any infusion. Again, the relation between family support and post-treatment nausea was via anxiety. When these hypothesized mediators were included in the model, the direct path from family support to anticipatory nausea remained significant, except at the fifth infusion. In addition to the direct effect of family support to anticipatory nausea, an indirect effect through anxiety was marginally significant at the fourth infusion and significant at the fifth infusion.

Furthermore, the path from anxiety to post-treatment nausea was significant at all four infusions, indicating that a higher level of anxiety is associated with more symptoms of post-treatment nausea. Finally, the path from post-treatment nausea at the previous infusion to anticipatory nausea at the target infusion was significant at all four infusions, indicating that more post-treatment nausea at the previous infusion is

associated with greater anticipatory nausea at the target infusion. It appears that the effect of anxiety on anticipatory nausea is mediated by the development of post-treatment nausea.

In summary, the results indicate that family support predicts the development of anticipatory nausea directly for the first five infusions or via the patient's anxiety level at the previous infusion at the fifth infusion. The patient's anxiety level predicts the development of subsequent anticipatory nausea indirectly through its relation with concurrent post-treatment nausea. Post-treatment nausea directly predicts the development of subsequent anticipatory nausea.

Discussion

This study examined the effects of family support on the development of a patient's anticipatory nausea during chemotherapy treatment. The results support the conditioning perspective in the development of nausea (Andrykowski & Jacobsen, 1993; Tomoyasu et al., 1996), by demonstrating that post-treatment nausea predicts the development of anticipatory nausea at the subsequent infusion.

In addition, the results in the present study reveal that family support reduces the development of anticipatory nausea directly and post-treatment nausea indirectly by reducing the patient's anxiety. These findings, showing a potential role for family support in mitigating a patient's chemotherapy-related nausea, have several implications. For example, the findings imply that helping patients and their families communicate in more satisfactory and supportive ways and maintaining an organized family system would be beneficial in reducing distress and chemotherapy-related nausea during cancer treatment. Specifically, these characteristics of family environment, independent of a

patient's anxiety level, impeded directly the development of anticipatory nausea during early cancer treatment, while those family support reduced the patient's anxiety and in turn, reduced the development of anticipatory nausea after a couple of first infusions. The impact of family relationships and family system seems to play bigger role than that of distress from dysfunctional family environment. Other mechanism than anxiety on the role of family support on a patient's anticipatory nausea needs to be studied as well in future studies. Patients' expectations, as an example, may play a significant role in developing chemotherapy-related nausea or vomiting (Montgomery et al., 1998; Roscoe, Hickok, & Morrow, 2000). On the other hand, the impact of family support on the development of post-treatment nausea was mediated by reducing a patient's anxiety. The current findings about the different role of family support on two types of highly related chemo-therapy related nausea need to be replicated with heterogeneous populations.

In addition, although family environment is generally considered to comprise stable characteristics that family members display over time, a major stressor, such as the occurrence of cancer in a family member, can alter familial relationships and ways of interacting. Thus, the role of changes in the family environment at different treatment stages, i.e., immediately after the diagnosis, during treatment, or after treatments end, also needs to be examined in future studies.

Limitations of this study should also be addressed. First, only the patients' perceptions of their family environment were assessed. Family dynamics are reciprocal between the patient and family members (Nicassio, Radojevic, Scholenfeld-Smith, & Dwyer, 1995); thus, both patient and family member perceptions about adjustment need to be included in future studies. Second, the present study assessed the family as a group

instead of assessing specific individuals in the family. Certain individuals in a family may exert a greater influence than others on a patient's adjustment to cancer. The unique roles of individual family members in specific domains of patient coping need to be clarified to better understand how the family's dynamic processes affect patient adjustment. Third, all measures utilized in the present study were patient's self-report, thus there may be a potential issue of response bias. Fourth, because each questionnaire packet was given to the subject to fill it out at home and asked to return in a week, the assessments for anxiety and nausea were retrospective and the actual time when the subjects filled the questions out was not available. Although this weakness in study design was compensated by using information of anxiety from a previous infusion to predict the severity and duration of anticipatory nausea at a target infusion, obtaining patient's anxiety level before getting infusion will be ideal to control any potential artifact. Finally, the findings in the present study need cautious interpretation when applied to other cancer populations than female breast cancer patients.

The findings of the present study support the general propositions set forth in the family systems theory and provide empirical evidence that the family environment influences a patient's adjustment to medical situations; specifically, nausea related to chemotherapy. Related studies will be needed to examine whether patients and families benefit from intervention programs that help them express feelings openly, avoid conflict, and maintain a balanced family structure.

References

American Cancer Society. Cancer Facts and Figures – 2000. New York, NY: American Cancer Society, 2000.

Andrykowski, M. A. (1990). The role of anxiety in the development of anticipatory nausea in cancer chemotherapy: A review and synthesis. Psychosomatic Medicine, 52, 458-475.

Andrykowski, M. A., & Jacobsen, P. B. (1993). Anticipatory nausea and vomiting with cancer chemotherapy. In W. Breitbart & J. Holland (Eds.), Psychiatric aspects of symptom management in cancer patients (pp. 107-128). Washington, DC: American Psychiatric Press.

Arbuckle, J. L., & Wothke, W. (1999). Amos 4.0 User's Guide. Chicago: SmallWaters Coporation.

Bloom, J. R. (1982). Social support, accommodation to stress and adjustment to breast cancer. Social Science & Medicine, 16, 1329-1338.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), Testing structural equation models (pp. 136-162). Newbury Park, CA: Sage.

Carnrike, C. L. M., Brantley, P. J., Bruce, B., Faruqui, S., Gresham, F. M., Buss, R. R., & Cocke, T. B. (1988). Test-retest reliability and concurrent validity of the Morrow Assessment of Nausea and Emesis (MANE) for the assessment of cancer chemotherapy-related nausea and vomiting. Journal of Psychopathology and Behavioral Assessment, 10, 107-116.

Carter, R. E., & Carter, C. A. (1993). Individual and marital adjustment in spouse pairs subsequent to mastectomy. American Journal of Family Therapy, 21, 291-300.

Chang, J. C. (1981). Nausea and vomiting in cancer patients: An expression of psychological mechanisms. Psychosomatics, 22, 707-710.

Cohen, S., & Herbert, T. B. (1996). Health psychology: Psychological factors and physical disease from the perspective of human psychoneuroimmunology. Annual Review of Psychology, 47, 113-142.

Curran, S. L., Andrykowski, M. A., & Studts, J. L. (1995). Short Form of the Profile of Mood States (POMS-SF): Psychometric information. Psychological Assessment. 7, 80-83.

De Boer, M. F., Ryckman, R. M., Pruyn, J. F. A., & van den Borne, H. W. (1999). Psychosocial correlates of cancer relapse and survival: A literature review. Patient Education & Counseling, 37, 215-230.

Falloon, I. R. H. (Ed.), (1988). Handbook of behavioral family therapy. New York, NY: Guilford.

Fobair, P. A., & Zabora, J. R. (1995). Family functioning as a resource variable in psychosocial cancer research: Issues and measures. Journal of Psychosocial Oncology, 13, 97-114.

Friedman, L. C., Baer, P. E., Nelson, D. V., Lane, M., Smith, F. E., & Dworkin, R. (1988). Women with breast cancer: Perception of family functioning and adjustment to illness. Psychosomatic Medicine, 50, 529-540.

Friedman, L. C., Lehane, D., Webb, J. A., Weinberg, A. D., & Cooper, H. P. (1994). Anxiety in medical situations and chemotherapy-related problems among cancer patients. Journal of Cancer Education, 9, 37-41.

Helgeson, V. S., & Cohen, S. (1996). Social support and adjustment to cancer: reconciling descriptive, correlational, and intervention research. Health Psychology, 15, 135-148.

Holahan, C. J., & Moos, R. H. (1986). Personality, coping, and family resources in stress resistance: A longitudinal analysis. Journal of Personality and Social Psychology, 51, 389-395.

Jacobs, J., Ostroff, J., & Steinglass, P. (1998). Family therapy: A systems approach to cancer care. In J. C. Holland (Ed.). Psycho-Oncology (pp. 994 – 1003). New York, NY: Oxford University Press.

Jacobsen, P. B., Bovbjerg, D. H., & Redd, W. H. (1993). Anticipatory anxiety in women receiving chemotherapy for breast cancer. Health Psychology, 12, 1-7.

Jamison, R. N., Burish, T. G., & Wallston, K. A. (1987). Psychogenic factors in predicting survival of breast cancer patients. Journal of Clinical Oncology, 5, 768-772.

Koopman, C., Hermanson, K., Diamond, S., Angell, K., & Spiegel, D. (1998). Social support, life stress, pain and emotional adjustment to advanced breast cancer. Psycho-Oncology, 7, 101-111.

Lederberg, M. S. (1998). The family of the cancer patient. In J. C. Holland (Ed.). Psycho-Oncology (pp. 981 – 993). New York, NY: Oxford University Press.

Lewis, F. M., Hammond, M. A., & Woods, N. F. (1993). The family's functioning with newly diagnosed breast cancer in the mother: the development of an explanatory model. Journal of Behavioral Medicine, 16, 351-370.

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. Psychological Bulletin, 103, 391-410.

McNair, D. M., Lorr, M., & Droppelman, L. F. (1971). Profile of Mood States. Educational and Industrial Testing Service

Mesters, I., van den Borne, H., McCormick, L., Pruyn, J., deBoer, M., & Imnos, T. (1997). Openness to discuss cancer in the Nuclear family: Scale, development, and validation. Psychosomatic Medicine, 59, 269-279.

Molassiotis, A., van den Akker, O. B., & Boughton, B. J. (1997). Perceived social support, family environment and psychosocial recovery in bone marrow transplant long-term survivors. Social Science & Medicine, 44, 317-325.

Montgomery, G. H., Tomoyasu, N., Bovbjerg, D. H., Andrykowski, M. A., Currie, V. E., Jacobsen, P. B., & Redd, W.H. (1998). Patient's pretreatment expectations of chemotherapy-related nausea are an independent predictor of anticipatory nausea. Annals of Behavioral Medicine, 20, 104-109.

Moos, R. H., & Moos, B. S. (1986). Family Environment Scale Manual (2nd Edition). Palo Alto, CA: Consulting Psychologists Press, Inc.

Morrow, G. R. (1992). A patient report measure for the quantification of chemotherapy induced nausea and emesis: Psychometric properties of the Morrow

Assessment of Nausea and Emesis (MANE). British Journal of Cancer - Supplement, 19, S72-74.

Morrow, G. R., & Roscoe, J. A. (1998). Anticipatory nausea and vomiting: models, mechanisms and management. In M. A. Dicoto (Ed.), Medical management of cancer treatment induced emesis (pp. 149-166). London: Martin Dunitz Ltd.

Morrow, G. R., Roscoe, J. A., & Hickok, J. T. (1998). Nausea and Vomiting. In J. C. Holland (Ed.), Psycho-oncology. (pp. 476-484). New York: Oxford University Press.

Morrow, G. R., Roscoe, J. A., Kirshner, J. J., Hynes, H. E., & Rosenbluth, R. J. (1998). Anticipatory nausea and vomiting in the era of 5-HT3 antiemetics. Supportive Care in Cancer, 6, 244-247.

Newell, S., Sanson-Fisher, R. W., Girgis, A., & Bonaventura, A. (1998). How well do medical oncologists' perceptions reflect their patients' reported physical and psychological problems? Data from a survey of five oncologists. Cancer, 83, 1640-1651.

Nicassio, P. M., Radojevic, V., Schoenfeld-Smith, K., & Dwyer, K. (1995). The contibution of family cohesion and the pain-coping process to depressive symptoms in fibromyalgia. Annuals of Behavioral Medicine, 17, 349-356.

Northhouse, L. L. (1995). The impact of cancer in women on the family. Cancer Practice, 3, 134-142.

Ostroff, J. S., & Steinglass, P. (1996). Psychosocial adaptation following treatment: A family systems perspective on childhood cancer survivorship. In L. Baider, C. L. Cooper, A. K. De-Nour (Eds.). Cancer and Family (pp. 129-147). New York, NY: John Wiley.

Peters-Golden, H. (1982). Breast cancer: Varied perceptions of social support in the illness experience. Social Science and Medicine, 16, 483-491.

Roscoe, J. A., Hickok, J. M., & Morrow, G. R. (2000). Patient expectations as predictor of chemotherapy-induced nausea. Annuals of Behavioral Medicine, 22, 121-126.

Spiegel, D., Bloom, J. R., & Gottheil, E. (1983). Family environment as a predictor of adjustment to metastatic breat carcinoma. Journal of Psychosocial Oncology, 1, 33-44.

Spiegel, D., & Kato, P. M. (1996). Psychosocial influences on cancer incidence and progression. Harvard Review of Psychiatry, 4, 10-26.

Spielberger, C. D., Gorsuch, R. L, & Luschene, R. E. (1974). Manual for the State-Trait Anxiety Inventory, Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C. D., Sydeman, S. J., Owen, A. E., Marsh, B. J. (1999). Measuring anxiety and anger with the State-Trait Anxiety Inventory (STAI) and the State-Trait Anger Expression Inventory (STAXI). In M. E. Maruish et al (Eds). The use of psychological testing for treatment planning and outcomes assessment (2nd ed.). (pp. 993-1021). Mahwah, NJ: Lawrence Erlbaum Associates, Inc., Publishers.

Steinglass, P. (1987). A systems view of family interaction and psychopathology. In T. Jacob (Ed.) Family interaction and psychopathology: Theories, methods, and findings (pp. 25-65). New York, NY: Plenum Press.

Tomoyasu, N., Bovbjerg, D. H., & Jacobsen, P. B. (1996). Conditioned reactions to cancer chemotherapy: Percent reinforcement predicts anticipatory nausea. Physiology and Behavior, 59, 273-276.

Varni, J. W., & Corwin, D. G. (1993). Growing up great. New York, NY: Berkley Books.

Williams, M. (1989). Family environment and general psychological distress level as possible predictors of anticipatory nausea and vomiting of cancer patients in chemotherapy treatment. Unpublished Dissertation. University of Temple.

Footnote

1. The observed variables for each relevant latent variable were specified not to have zero loading on the relevant factor, while the loadings on the other factor were constrained to equal zero. For example, within family support factors, conflict was specified not to have zero loading on the family support latent variable, while the loadings on measures for other latent variables (i.e., anxiety, anticipatory nausea, and post-treatment nausea) were constrained to equal zero. Error matrices of observed variables were freed to allow them to correlate diagonally, and all other off-diagonal elements in the measurement error matrices were fixed to zero.
2. The additional error terms allowed to be correlated were as follows: error terms between expression, and organization and control, between conflict and control, and between organization and control.

Author Note

Youngmee Kim, Gary Morrow, Joseph Roscoe, and Jane Hickok, Behavioral Medicine, University of Rochester School of Medicine.

This research was supported by the National Cancer Institute Grant CA37420.

We thank Drs Flynn at Metro-Minnesota CCOP, Hynes at Wichita CCOP, Kirshner at Syracuse Hematology-Oncology CCOP, and Pierce at Northwest CCOP for help with data collection. We also thank Dr. OJ Sahler for her helpful comments on a draft of this article. We dedicate the current research to the memory of Heekyoung Kim.

Correspondence concerning this article should be addressed to Youngmee Kim, Cancer Prevention and Control, Mount Sinai School of Medicine, One Gustave Levy Place, Box 1130, New York, NY 10029-6574. Electronic mail may be sent to youngmee.kim@mssm.edu.

Table 1. Means and SD's of Study Variables

	RX1	RX2	RX3	RX4	RX5
Family Environment Scale					
Cohesion	57.75 (12.83)				
Expression	54.74 (12.16)				
Conflict	42.29 (10.39)				
Organization	54.84 (11.88)				
Control	46.87 (10.75)				
Anxiety					
State_STAI	38.24 (11.97)	38.14 (11.91)	39.81 (12.54)	39.91 (12.71)	39.49 (12.49)
POMS	11.94 (6.78)	12.19 (6.78)	12.72 (7.13)	12.76 (7.23)	12.55 (7.15)
Post-Treatment Nausea					
Severity	1.78 (1.59)	1.66 (1.58)	1.54 (1.57)	1.51 (1.55)	1.56 (1.57)
Duration (hours)	22.53 (32.92)	19.80 (30.57)	23.35 (33.48)	23.58 (33.64)	23.84 (34.07)
Anticipatory Nausea					
Severity		.33 (.87)	.35 (.87)	.34 (.87)	.49 (1.03)
Duration (hours)		4.31 (17.07)	3.84 (14.95)	3.18 (13.86)	4.30 (15.21)

Note. RX = Treatment Infusion; Numbers in parentheses are SD's

Table 2. Zero-Order Correlations among Family Environment Subscales

	1	2	3	4	5
1. Cohesion	-				
2. Expression	.38***	-			
3. Conflict	-.54***	-.14***	-		
4. Organization	.47***	.11*	-.39***	-	
5. Control	-.13**	-.29***	.23***	.14***	-

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 3. Zero-Order Correlations among Anxiety and Nausea Measures Across Treatment Infusions

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. STAI_1	-																						
2. POMS_1	.76	-																					
3. PNS_1	.19	.22	-																				
4. PND_1	.16	.16	.60	-																			
5. STAI_2	.64	.65	.18	.16	-																		
6. POMS_2	.58	.65	.20	.15	.81	-																	
7. PNS_2	.16	.18	.58	.47	.26	.27	-																
8. PND_2	.08	.10	.41	.56	.18	.19	.61	-															
9. ANS_2	.14	.14	.25	.21	.15	.19	.30	.22	-														
10. AND_2	.06	.06	.15	.26	.08	.08	.19	.23	.64	-													
11. STAI_3	.56	.56	.21	.11	.70	.62	.23	.11	.12	.07	-												
12. POMS_3	.52	.57	.21	.14	.65	.65	.27	.15	.15	.07	.82	-											
13. PNS_3	.16	.17	.51	.39	.21	.20	.64	.43	.19	.10	.25	.28	-										
14. PND_3	.08	.06	.37	.44	.10	.11	.42	.53	.19	.15	.10	.16	.65	-									
15. ANS_3	.09	.09	.19	.11	.17	.16	.26	.18	.34	.18	.19	.18	.31	.21	-								
16. AND_3	.04	.03	.16	.15	.06	.01	.19	.22	.28	.37	.10	.07	.16	.21	.57	-							
17. STAI_4	.55	.55	.21	.12	.70	.58	.25	.17	.20	.10	.71	.62	.22	.14	.20	.08	-						
18. POMS_4	.50	.53	.18	.13	.66	.61	.25	.17	.22	.10	.66	.68	.23	.11	.19	.04	.88	-					
19. PNS_4	.11	.13	.46	.37	.18	.18	.56	.40	.15	.07	.20	.20	.63	.43	.26	.18	.24	.25	-				
20. PND_4	.07	.06	.32	.39	.12	.14	.40	.50	.13	.12	.13	.15	.47	.60	.21	.19	.16	.16	.65	-			
21. ANS_4	.08	.09	.23	.19	.17	.12	.27	.24	.29	.21	.17	.19	-.32	.22	.50	.36	.16	.19	.35	.30	-		
22. AND4	.01	.01	.17	.19	.05	.02	.18	.21	.25	.30	.08	.07	.18	.17	.41	.54	.06	.08	.20	.23	.60	-	
23. ANS_5	.18	.16	.26	.21	.20	.19	.31	.22	.32	.18	.22	.22	.33	.20	.51	.26	.27	.28	.37	.27	.52	.32	-
24. AND_5	.07	.06	.13	.20	.08	.08	.18	.22	.25	.26	.06	.05	.16	.18	.34	.40	.13	.13	.21	.22	.35	.51	.54

Note. Correlation coefficients greater than .09 are significant at $p < .05$;
_1 was measured at the first infusion; _2 was measured at the second infusion; _3 was measured at the third infusic
_4 was measured at the fourth infusion; _5 was measured at the fifth infusion;
STAI = State Anxiety Inventory; POMS = Profile of Mood States_state anxiety;
PNS = Post-treatment Nausea Severity; PND = Post-treatment Nausea Duration;
ANS = Anticipatory Nausea Severity; AND = Anticipatory Nausea Severity

Table 4. Zero-Order Correlations between Family Environment Subscales and Anxiety, Nausea Measures Across Treatm
Infusions

	Cohesion	Expression	Conflict	Organization	Control
1. STAI_1	-.20	-.14	.17	-.08	.11
2. POMS_1	.13	.12	-.14	.08	-.12
3. PNS_1	-.04	.02	.01	-.02	.06
4. PND_1	.05	.08	-.01	.02	.12
5. STAI_2	-.26	-.19	.24	-.15	.14
6. POMS_2	.22	.15	-.17	.11	-.13
7. PNS_2	-.10	-.01	.05	-.01	.16
8. PND_2	.02	.02	.02	.02	.14
9. ANS_2	-.11	-.06	.04	-.06	.02
10. AND_2	-.06	.01	.06	-.04	.02
11. STAI_3	-.26	-.15	.22	-.12	.06
12. POMS_3	.21	.12	-.18	.12	-.09
13. PNS_3	-.13	-.02	.10	-.04	.16
14. PND_3	-.04	.01	.09	-.01	.13
15. ANS_3	-.18	-.03	.15	-.09	.03
16. AND_3	-.06	-.02	.14	-.02	.03
17. STAI_4	-.24	-.16	.21	-.12	.06
18. POMS_4	.21	.14	-.20	.10	-.05
19. PNS_4	-.07	.05	.09	-.06	.07
20. PND_4	-.05	.05	.10	-.07	.07
21. ANS_4	-.15	-.03	.17	-.11	.02
22. AND4	-.12	.01	.05	.00	-.01
23. ANS_5	-.08	.06	.08	-.08	-.01
24. AND_5	-.06	.03	.10	-.03	.04

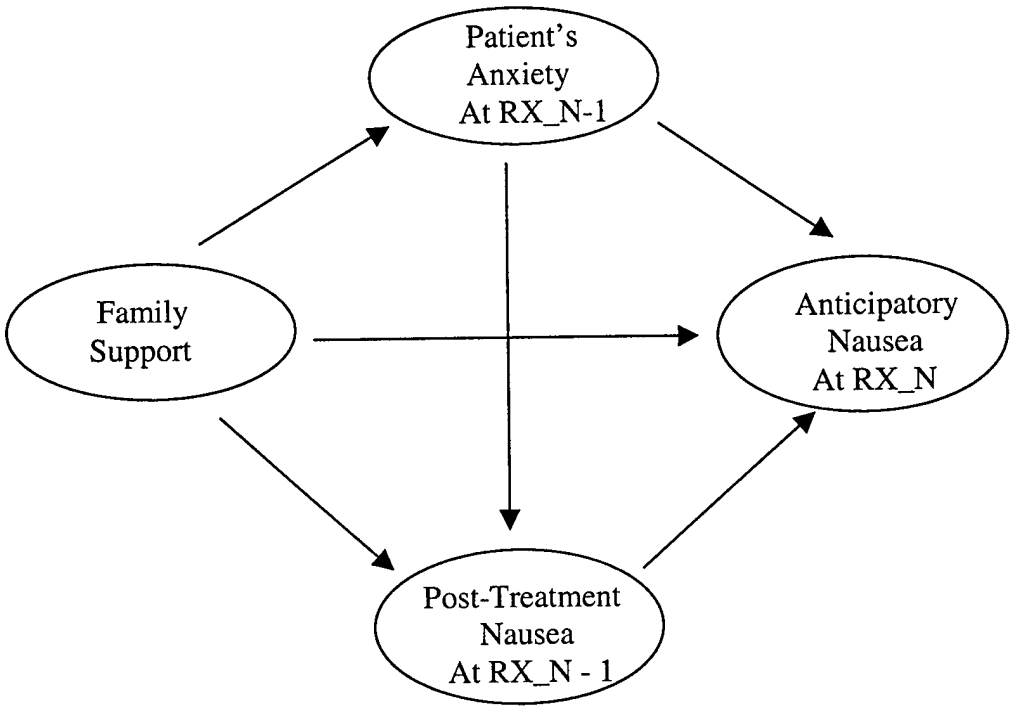
Note. Correlation coefficients greater than .09 are significant at $p < .05$;
_1 was measured at the first infusion; _2 was measured at the second infusion; _3 was measured at the third infusic
_4 was measured at the fourth infusion; _5 was measured at the fifth infusion;
STAI = State Anxiety Inventory; POMS = Profile of Mood States_state anxiety;
PNS = Post-treatment Nausea Severity; PND = Post-treatment Nausea Duration;
ANS = Anticipatory Nausea Severity; AND = Anticipatory Nausea Severity

Table 5. Model Fit Indices and Standardized Coefficients of Paths

	RX1	RX2	RX3	RX4	RX5
Direct Effects Model Testing					
Family → AN_RX_N					
χ^2 (9)	-	8.00	14.50	20.10	13.40
Path coeff	-	-.11*	-.18***	-.17***	-.11+
Family → Anx_RX_N-1					
χ^2 (9)	13.30	11.20	11.20	6.80	-
Path coeff	-.23***	-.32***	-.30***	-.29***	-
Family → PN_RX_N-1					
χ^2 (9)	?	28.40	21.60	15.60	-
Path coeff	?	-.02+	-.11**	-.10+	-
Full Model Testing					
Model Fit Indices					
χ^2 (34)		65.37	71.85	66.32	41.31
GFI		.98	.98	.98	.99
NFI		.96	.96	.97	.98
CFI		.98	.98	.98	1.00
RMSEA		.04	.05	.04	.02
Standardized Coefficients					
Family → AN_RX_N		-.12*	-.17***	-.12**	.00
Family → Anxiety_RX_N		-.24***	-.33***	-.30***	-.29***
Family → PN_RX_N-1		.08	.02	-.05	-.01
Anxiety_RX_N-1 → AN_ RX_N		.05	.04	.08+	.20***
PN_RX_N-1 → AN_ RX_N		.32***	.28***	.25***	.34***
Anxiety_RX_N-1 → PN_RX_N-1		.28***	.32***	.27***	.26***

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Note: RX = treatment infusion; N = number of treatment infusion;
AN = Anticipatory Nausea; PN = Post-treatment Nausea



Note: RX_N = number of infusion; RX_N – 1 = previous infusion of a target infusion